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TRANSACTIONS

OF

THE FORTY-EIGHTH ANNUAL MEETING

WITH

CONSTITUTION AND BY-LAWS

OF THE

ILLINOIS STATE MEDICAL SOCIETY

HELD IN

GALESBURG, ILL., MAY 17, 18 AND 19, 1898.

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CONTENTS.

PAGE

Place of Next Meeting II
Officers for the Year 1898-9 VII
Officers of Sections and Committees VIII
List of Officers and Places of Meeting since the Organization of the Society X
List of Members XI
List of Members in Attendance XXIV

RECORD OF PROCEEDINGS—
Address of Welcome 1
Report of Executive Committee 5
Report of Committee of Arrangements 8
Report of Committee on Publication 13
Treasurer's Report 15
Report of Committee on Medical Societies 16
Report of Committee on Medical Legislation 20
Report of Committee on Necrology and Biography 29
Annual Dinner 37
Report of Nominating Committee 38
Remarks of Retiring President 42
Remarks of President Elect 43

ADDRESSES AND PAPERS READ BEFORE THE SOCIETY—
Address of the President. Advances in the Domain of Preventive Medicine ..... *J. M. G. Carter* 47
Address of Section Three. State Control in Medicine ..... *J. W. Pettit* 60

279279

ADDRESSES AND PAPERS—*Continued.* PAGE

Malnutrition in Infants.....*Frank Parsons Norbury* 73

Modified Milk .....*Frank Spooner Churchill* 83

Infantile Scurvy, with Report of Cases.....*Isaac A. Abt* 90

Discussion 106

Some Points Concerning the Diagnosis of Pleurisy with Effusion, with Particular Reference to Misleading Physical Signs..... .....*James B. Herrick* 110

Discussion 121

The Smegma Bacillus.....*J. L. Miller* 124

Remarks on the Treatment of Neurasthenia..... .....*Hugh T. Patrick* 136

Discussion 157

The Significance of Certain Signs and Symptoms in Heart Insufficiency..... .....*B. W. Sippy* 161

Discussion 169

The Therapeutic Use of Digitalis as Shown by its Pharmacologic Action on the Circulatory Organs in Mammals.....*S. A. Matthews* 172

Discussion 186

The Untoward Action of Drugs, with Special Reference to Hypnotics and Antipyretics.....*George F. Butler* 187

Discussion 192

Streptococcal Infection..... .....*Geo. W. Cox* 199

Discussion 213

Observations on the Blood of Tubercular Patients..... .....*George W. Johnson* 215

Discussion 222

An Undescribed Form of La Grippe.....*H. W. Chapman* 223

Infant Feeding at Home and Abroad.....*A. C. Cotton* 225

Chelidonium Majus in Inoperable Carcinoma..*C. C. Hunt* 233

Summary of Laws Governing Expert Testimony in Other States and Countries.....*James Osborne DeCourcy* 241

Defects of Laws Governing Expert Testimony in Illinois.. .....*Sanger Brown* 258

Expert Testimony.....*Frank P. Norbury* 261

Personal Experience with the Dixon Decision..... .....*Denslow Lewis* 264

ADDRESSES AND PAPERS—*Continued.* PAGE

Expert Testimony: Suggestions for the Outlines of a Law ..... *D. W. Graham* 282

Defects of the Laws of this State Governing Medical Practice..... *Geo. N. Kreider* 286

Needed Medical Legislation in Illinois... *Harold N. Moyer* 289

Discussion on Symposium of Papers on Medical Legislation..... 293

The Legislation Necessary to Promote Better Sanitation Throughout the State..... *J. A. Egan* 299

Uræmia in the Process of Child-Bearing... *Henry F. Lewis* 312

Discussion..... 351

An Improvement in the Technic of the After-Treatment of Peritoneal Section..... *Henry T. Byford* 354

Discussion..... 357

Operative Treatment of Carcinoma Uteri..... ..... *Franklin H. Martin* 359

Discussion..... 368

The Diagnosis and Differential Diagnosis of Pulmonary Abscess and Gangrene with View to Surgical Treatment ..... *Robert H. Babcock* 370

Discussion..... 384

The Conservation of Tissue and Function in Pelvic Surgery..... *Henry P. Newman* 386

Discussion..... 395

Sacro-Iliac Disease—Tubercular..... *L L McArthur* 397

Discussion..... 408

A New Device for Obtaining the Urine Separately from the two Kidneys in Either Sex..... ..*M. L. Harris* 410

Discussion..... 413

The Treatment of Acute Abscess and Gangrene of the Lung..... *A. E. Halstead* 415

Discussion..... 423

Urinary Fistulæ..... ..... *W. M. Catto* 425

Points in Minor Surgery..... *A. C. Corr* 432

Discussion..... 443

An Interesting Case of Pyonephrosis.... *Albert I. Bouffleur* 446

ADDRESSES AND PAPERS—*Continued.* PAGE

Discussion 455

Pathological Histology of Intestinal Union After the Use of the Frank Bone Coupler.....*Jacob Frank* 458

Discussion 465

The Repair of Bone.....*H. C. Fairbrother* 468

Discussion 476

A Plea for the Early Operation for Lacerations of the Cervix Uteri.....*Joseph B. Bacon* 482

Discussion 488

Plastic Operations on the Tubes.....*Emil Ries* 491

Discussion 496

The Treatment of Septic Infections Following Pin-Pricks Abrasions and Similar Injuries..*Edward H. Ochsner* 497

Relation of Middle-Ear Disease to Facial Spasm..*J. E. Best* 506

Hydramnios: Its Effect Upon Gestation and Labor..... .....*Eliza H. Root* 508

Historical 522

Constitution..... 523

By-Laws 528

OFFICERS, COMMITTEES AND LIST OF MEMBERS

FOR THE YEAR 1898-99.

OFFICERS.

PRESIDENT,
T. J. PITNER, - - - - JACKSONVILLE.

FIRST VICE-PRESIDENT,
HAROLD N. MOYER, - - - CHICAGO.

SECOND VICE-PRESIDENT,
J. T. McANALLY, - - CARBONDALE.

PERMANENT SECRETARY,
EDMUND W. WEIS, - - - OTTAWA.

ASSISTANT SECRETARY,
W. F. GRINSTEAD, - - - - CAIRO.

TREASURER,
GEORGE N. KREIDER, - SPRINGFIELD.

JUDICIAL COUNCIL.

J. L. WHITE, BLOOMINGTON. E. P. COOK, MENDOTA.
D. W. GRAHAM, CHICAGO.
C. C. HUNT, DIXON. HUGH T. PATRICK, CHICAGO.
C. DUHADWAY, JERSEYVILLE.
J. F. PERCY, GALESBURG. JAMES L. REAT, TUSCOLA.
C. E. BLACK, JACKSONVILLE.

OFFICERS OF SECTIONS.

SECTION ONE.

Practice of Medicine, Medical Specialties, Materia Medica and Therapeutics.

CHAIRMAN—A. C. COTTON, Chicago.

SECRETARY—H. W. WOODRUFF, Joliet.

SECTION TWO.

Surgery, Surgical Specialties and Obstetrics.

CHAIRMAN—WELLER VAN HOOK, Chicago.

SECRETARY—E. M. SUTTON, Peoria.

SECTION THREE.

Etiology, State Medicine and Medical Jurisprudence.

CHAIRMAN—C. B. JOHNSON, Champaign.

SECRETARY—H. C. FAIRBROTHER, East St. Louis.

COMMITTEES.

Executive Committee.
(*Ex-Officio.*)

T. J. PITNER, Jacksonville. EDMUND W. WEIS, Ottawa.
WELLER VAN HOOK, Chicago. C. B. JOHNSON, Champaign.
J. C. SULLIVAN, Cairo. A. C. COTTON, Chicago.

Committee of Arrangements.

J. C. SULLIVAN, Chairman, Cairo. W. F. GRINSTEAD, Cairo.
S. B. CARY, Cairo. JOHN T. WALSH, Cairo.
J. J. RENDLEMAN, Cairo.

Committee on Publication.

EDMUND W. WEIS, Ottawa. T. J. PITNER, Jacksonville.
GEORGE N. KREIDER, Springfield.

COMMITTEES—*Continued.*

Committee on Medical Legislation.

J. W. PETTIT, Chairman, Ottawa. H. N. MOYER, Chicago.
GEO. N. KREIDER, Springfield. THE PRESIDENT, (Ex-Officio.)

Committee on Necrology and Biography.

JOHN H. HOLLISTER, Chicago. O. B. WILL, Peoria.
E. J. BROWN, Decatur.

Committee on Medical Societies.

C. W. HALL, Kewanee. J. A. BAUGHMAN, Neoga.
J. O. DECOURCY, East St. Louis.

Committee on Registration.
(Ex.-Officio.)

GEO. N. KREIDER, Springfield. W. F. GRINSTEAD, Cairo.

Committee on Society History.

N. S. DAVIS, Chicago. J. H. HOLLISTER, Chicago.
ROBERT BOAL, Lacon. EDMUND ANDREWS, Chicago.
DE LASKIE MILLER, Chicago. T. D. FITCH, Chicago.
E. INGALS, Chicago. L. G. THOMPSON, Lacon.

LIST OF OFFICERS AND PLACES OF MEETING SINCE THE ORGANIZATION OF THE SOCIETY.

YR.	PRESIDENT.	VICE-PRES'T.	SECRETARY.	TREASURER.	PLACE OF MEETING.
1850*	Rudolphus Rouse	.....	Edwin G. Meek	....	Springfield.
1850	William B. Herrick	Rudolph. Rouse	Edwin G. Meek	John A. Halderman	Springfield.
1851	Samuel Thompson	E. McArthur	H. Schoemaker	E. Rouse	Peoria.
1852	Rudolphus Rouse	Thomas Hall	E. S. Cooper	Edward Dickenson	Jacksonville.
1853	Daniel Brainard	C. N. Andrews	H. A. Johnson	A. B. Chambers	Chicago.
1854	C. N. Andrews	Sam'l Thompson	H. A. Johnson	N. S. Davis	La Salle.
1855	N. S. Davis	E. R. Roe	E. Andrews	J. V. Z. Blaney	Bloomington.
1856	H. Noble	T. D. Washburn	N. S. Davis	J. V. Z. Blaney	Vandalia.
1857	C. Goodbreak	A. D. McArthur	H. A. Johnson	J. V. Z. Blaney	Chicago.
1858	H. A. Johnson	William Lyman	N. S. Davis	J. W. Freer	Rockford.
1859	David Prince	H. W. Davis	N. S. Davis	J. W. Freer	Decatur.
1860	Wm. M. Chambers	T. K. Edmiston	N. S. Davis	J. W. Freer	Paris.
1863	A. McFarland	A. H. Luce	N. S. Davis	J. H. Hollister	Jacksonville.
1864	A. H. Luce	J. M. Steele	N. S. Davis	J. H. Hollister	Chicago.
1865	J. M. Steele	F. B. Haller	N. S. Davis	J. H. Hollister	Bloomington.
1866	F. B. Haller	L. T. Hewens	N. S. Davis	J. H. Hollister	Decatur.
1867	S. W. Noble	D. W. Young	N. S. Davis	J. H. Hollister	Springfield.
1868	S. T. Trowbridge	J. O. Hamilton	N. S. Davis	J. H. Hollister	Quincy.
1869	S. T. Trowbridge	J. O. Hamilton	N. S. Davis	J. H. Hollister	Chicago.
1870	J. V. Z. Blaney	G. W. Albin	T. D. Fitch	J. H. Hollister	Dixon.
1871	G. W. Albin	John Murphy	T. D. Fitch	J. H. Hollister	Peoria.
1872	J. O. Hamilton	T. Worrell	T. D. Fitch	J. H. Hollister	Rock Island.
1873	D. W. Young	T. D. Washburn	T. D. Fitch	J. H. Hollister	Bloomington.
1874	T. F. Worrell	E. L. Holmes	T. D. Fitch	J. H. Hollister	Chicago.
1875	J. H. Hollister	Wm. P. Pierce	T. D. Fitch	Wm. E. Quine	Jacksonville.
1876	T. D. Washburn	J. L. White	T. D. Fitch	J. H. Hollister	Urbana.
1877	T. D. Fitch	S. H Birney	N. S. Davis	J. H. Hollister	Chicago.
1878	J. L. White	E. P. Cook	N. S. Davis	J. H. Hollister	Springfield.
1879	E. P. Cook	J. S. Whitmire	N. S. Davis	J. H. Hollister	Lincoln.
1880	Ephriam Ingals	G. W. Jones	N. S. Davis	J. H. Hollister	Bellville.
1881	G. W. Jones	William Hill	S. J. Jones	J. H. Hollister	Chicago.
1882	Robert Boal	A. T. Darrah	S. J. Jones	J. H. Hollister	Quincy.
1883	A. T. Darrah	L. G. Thompson	S. J. Jones	J. H. Hollister	Peoria.
1884	E. Andrews	D. S. Booth	S. J. Jones	Walter Hay	Chicago.
1885	D. S. Booth	S. C. Plummer	S. J. Jones	Walter Hay	Springfield.
1886	William A. Byrd	W. T. Kirk	S. J. Jones	Walter Hay	Bloomington.
1887	William T. Kirk	Elias Wengen	D. W. Graham	Walter Hay	Chicago.
1888	William O. Ensign	C. W. Earle	D. W. Graham	Walter Hay	Rock Island.
1889	C. W. Earle	P. H. Oyler	D. W. Graham	T. W. McIlvane	Jacksonville.
1890	John Wright	L. P. Mathews	D. W. Graham	T. W. McIlvane	Chicago.
1891	John P. Mathews	Charles C. Hunt	D. W. Graham	George N. Kreider	Springfield.
1892	Charles C. Hunt	E. F. Ingals	D. W. Graham	George N. Kreider	Vandalia.
1893	E. Fletcher Ingals	Otho B. Will	D. W. Graham	George N. Kreider	Chicago.
1894	Otho B. Will	D. R. Brower	J. B. Hamilton	George N. Kreider	Decatur.
1895	Daniel R. Brower	A. C. Corr	J. B. Hamilton	George N. Kreider	Springfield.
1896	D. W. Graham	J. M. G. Carter	J. B. Hamilton	George N. Kreider	Ottawa.
1897	A. C. Corr	J. M. G. Carter	J. B. Hamilton	George N. Kreider	East St. Louis.
1898	J. M. G. Carter	T. J. Pitner	E. W. Weis	George N. Kreider	Galesburg.

*Preliminary Convention.

EXPLANATON.—No meeting was held in the years 1861 or 1862 "on account of the large number of members engaged as surgeons in the volunteer army of the United States."

Until the meeting of 1869 it was the custom to elect officers the first day, and for the President to have charge of the meeting at which he was elected. Hence Dr. Trowbridge seems to have presided over two meetings, although elected President but once.

LIST OF MEMBERS.

Roman indicates those who have paid their dues for the current year.
Italics those who are delinquent one or more years.
SMALL CAPITALS those who are life members.
*Life members who have paid dues for the current year.

NAME.	POST OFFICE.	COUNTY.
Abbott, W. C	Chicago	Cook.
Abt, Isaac A	Chicago	Cook.
Adams, W. W	Atkinson	Henry.
Adelsberger, Louis	Waterloo	Monroe.
Aldrich, D. W	Galesburg	Knox.
Allen, N. B	Mt. Vernon	Jefferson.
Allison, J. W	Essex	Kankakee.
Alsop, T. E	Carlyle	Clinton.
ANDREWS, EDMUND	Chicago	Cook.
Andrews, Wells	Chicago	Cook.
Anthony, Frank	Sterling	Whiteside.
Armstrong, J. M	Edwardsville	Madison.
Armstrong, J. W	Centralia	Marion.
Babcock, R. H	Chicago	Cook.
Bacon, C. S	Chicago	Cook.
Bacon, J. B	Chicago	Cook.
Ball, A. W	Rushville	Schuyler.
Ball, R. M. C	Monmouth	Warren.
Bailey, M. R	Elliott	Ford.
Baker, J. B	Pontiac	Livingston.
Barlow, C	Eaton	Crawford.
Barnes, S. M	Fairbury	Livingston.
Barnes, Wm	Decatur	Macon.
Bartells, H. W. F	Bensenville	DuPage.
BARTLETT, A. T	Virden	Macoupin.
Baughman, J. A	Neoga	Cumberland.
Baum, W. L	Chicago	Cook.
Baxter, A. J	Astoria	Fulton.
Beal, A. M	Moline	Rock Island.
Bedford, J. R	Verona	Grundy.
Bernhardi, C	Rock Island	Rock Island.
Bernreuter, Edward	Mt. Olive	Macoupin.
Best, J. E	Arlington Heights	Cook.
Bettman, B	Chicago	Cook.
Bickel, A. S	Chillicothe	Peoria.
Billings, Frank	Chicago	Cook.
Binkley, J. T	Chicago	Cook.
Bird, A. M	Mason City	Mason.

NAME.	POST OFFICE.	COUNTY
Bishop, S. S	Chicago	Cook.
Black, C. E	Jacksonville	Morgan.
Black, J. N	Clayton	Adams.
Blackburn, M. H	Dover	Bureau.
Blanchard, M. E	Marseilles	La Salle.
BOAL, ROBERT	Lacon	Marshall.
Bolles, E	Macomb	McDonough.
Bonar, B. L	Streator	La Salle.
Borland, M. W	Chicago	Cook.
Boshell, H. N	Melvin	Ford.
Bouffleur, A. I	Chicago	Cook.
Bower, G. S	Ransom	La Salle.
Bower, R. W	Sheridan	La Salle.
Bowers, W. C	Decatur	Macon.
Bowman, L. M	Alton	Madison.
Boyles, J. M	Louisville	Clay.
Boyles, J. W	Clay City	Clay.
Bradway, C. F	Abingdon	Knox.
Braffet, J. H	Paw Paw	Lee.
Braunsworth, Anna M	Chicago	Cook.
Brayton, Sarah H	Evanston	Cook.
Breckenridge, S. L	Riverside	Cook.
Bremmer, H. A	Merritt	Morgan.
Brill, J. A	Chicago	Cook.
Brittin, A. L	Athens	Menard.
Brœning, Max	Carlyle	Clinton.
Brophy, T. W	Chicago	Cook.
Brobst, C. H	Peoria	Peoria.
Brower, D. R	Chicago	Cook.
Brown, E. J	Decatur	Macon.
Brown, H. B	Lincoln	Logan.
Brown, M. R	Chicago	Cook.
Brown, Sanger	Chicago	Cook.
Burke, C. O	Atlanta	Logan.
Burnham, A. F	Jacksonville	Morgan.
Burns, S. P	Bible Grove	Clay.
Burrows, T. W	Ottawa	La Salle.
Butterfield, E. H	Ottawa	La Salle.
Buxton, W. E	Samsville	Edwards.
Byford, H. T	Chicago	Cook.
Byrne, John H	Chicago	Cook.
CALDWELL, W. S	Freeport	Stephenson.
Campbell, A. E	Clinton	De Witt.
Campbell, J. Y	Paxton	Ford.
Carroll, C. L	Taylorville	Christian.
Carroll, E. J	Leland	La Salle.
Carter, C. C	Rock Island	Rock Island.
Carter, J. M. G	Waukegan	Lake.
Carter, W. A	Trenton	Clinton.
Casselberry, W. E	Chicago	Cook.
Cassingham, M	Gardner	Grundy
Catto, W. M	Decatur	Macon.

NAME.	POST OFFICE.	COUNTY.
Chapin, H. A	Whitehall	Greene.
Chapman, A. L	Carlock	McLean.
Chapman, H. W	Whitehall	Greene.
Chenoweth, C	Decatur	Macon.
Chenoweth, W. J	Decatur	Macon.
Chew, J. H	Chicago	Cook.
Chrisman, W. D	Lafayette	Stark.
Clarke, S	Effingham	Effingham.
Clausius, M. F	Barrington	Cook.
Cole, W. H	Kewanee	Henry.
Coleman, J. E	Canton	Fulton.
Colt, J. D	Litchfield	Montgomery.
Colyer, J. R	Arthur	Moultrie.
Combs, G. W	Ridgeway	Gallatin.
Conibear, W. H	Morton	Tazewell.
Conley, D. S	Streator	La Salle.
Connor, J. J	Pana	Christian.
Cook, E. P	Mendota	La Salle.
Cook, W. H	Coffeen	Montgomery.
Corbus, J. C., jr	Troy Grove	La Salle.
Corr, A. C	Carlinville	Macoupin.
Corr, L. H	Carlinville	Macoupin.
Cotton, A. C	Chicago	Cook.
Coultas, R. J	Mattoon	Coles.
Coulter, J. H	Chicago	Cook.
Covey, J. E	Lexington	McLean.
Cowan, J. E	Galesburg	Knox.
Cox, Geo. W	Chicago	Cook.
Cox, J. Neil	North Henderson	Mercer.
Cox, W. M	Mt. Sterling	Brown.
Cozad, James	Reynolds	Rock Island.
Craig, G. G	Rock Island	Rock Island.
Crawford, N. B	Eureka	Woodford.
Crow, J. T	Carrollton	Greene.
Cruter, Chas. D	Quincy	Adams.
Culbertson, S. D	Piper City	Ford.
Curtis, R. M	Union	McHenry.
Dalton, W. B	Scottville	Macoupin.
Danforth, I. N	Chicago	Cook.
Davidson, T. W	Galesburg	Knox.
Davis, Effa V	Chicago	Cook.
Davis, Elias	Nilwood	Macoupin.
Davis, N. S., jr	Chicago	Cook,
*Davis, N. S., sr	Chicago	Cook.
Day, J. A	Winchester	Scott.
Day, W. C	Winchester	Scott.
Deal, John	Riverton	Sangamon.
DeCourcy, J. O	E. St. Louis	St. Clair.
DeLee, J. B	Chicago	Cook.
Detwiler, E. S	LaGrange	Cook.
DeVeny, S. C	Chicago	Cook.
Dewey, F. J	Chicago	Cook.

NAME.	POST OFFICE.	COUNTY.
Dewey, R.	Walwatosa, Wis.	
Dicus, Geo. A.	Streator	La Salle.
Dicus, J. F.	Streator	La Salle.
Dickinson, Frances	Chicago	Cook.
Dicks, T. A.	Broadlands	Champaign.
Dinges, H. A.	Red Bud	Randolph.
Dixon, J. N.	Springfield	Sangamon.
Dœring, E. J.	Chicago	Cook.
Doolittle, W. H.	Woodstock	McHenry.
Dougall, Wm.	Joliet	Will.
Dougherty, P.	Chicago	Cook.
Douglas, D. T.	Colfax	McLean.
Downey, B. J.	Ottawa	La Salle.
Doyle, M. R.	E. St. Louis	St. Clair.
Dubs, R. S.	Chicago	Cook.
Dudley, E. C.	Chicago	Cook.
DuHadway, C.	Jerseyville	Jersey.
Dunn, L. D.	Moline	Rock Island.
Dwyer, J. W. B.	E. St. Louis	St. Clair.
Eades, C. J.	Oquawka	Henderson.
Earel, A. M.	Monica	Peoria.
Earle, A. M.	Abingdon	Knox.
Earle, F. B.	Chicago	Cook.
Easley, Wm. T.	Greenville	Bond.
Eddy, W. J.	Shelbyville	Shelby.
Edlen, E. A.	Moline	Rock Island.
Edwards, A. R.	Chicago	Cook.
Egan, J. A.	Springfield	Sangamon.
Eldridge, F. P.	Greenview	Menard.
Elion, Carl	Altona	Knox.
Elliott, A. R.	Chicago	Cook.
Engert, Rosa H.	Chicago	Cook.
ENSIGN, W. O.	Rutland	La Salle.
Etheridge, J. H.	Chicago	Cook.
Evans, C. W.	Chicago	Cook.
Everett, E. S.	Lacon	Marshall.
Eyster, G. L.	Rock Island	Rock Island.
Fairbrother, H. C.	E. St. Louis	St. Clair.
Farley, W. K.	Waterman	DeKalb.
Favill, H. B.	Chicago	Cook.
Fenger, Christian	Chicago	Cook.
Ferguson, S. T.	Joliet	Will.
Ferrell, H. B.	Carterville	Williamson.
Fiegenbaum, E. W.	Edwardsville	Madison.
Fiegenbaum, J. H.	Alton	Madison.
FINK, L. M.	Hillsboro	Montgomery.
Firebaugh, I. L.	Robinson	Crawford.
Fischer, C. J. C.	Carlinville	Macoupin.
Fish, W. H.	Baylis	Pike.
Fisher, Waldo	Alton	Madison.
FITCH, T. D.	Chicago	Cook.

NAME.	POST OFFICE.	COUNTY.
Fitch, W. H	Rockford	Winnebago.
Fitts, A. A	Batavia	Kane.
Fletcher, Jos	Mendon	Adams.
Flexer, J. R	Joliet	Will.
Foster, A. H	Chicago	Cook.
Frank, Jacob	Chicago	Cook.
Fraser, W. H	La Salle	La Salle.
Freeman, J. A	Millington	Kendall.
Friend, W. M	Sumner	Lawrence.
Fringer, G. W	Pana	Christian.
Fuetterer, Gustav	Chicago	Cook.
Gaffner, T	Trenton	Clinton.
Garrison, B. E	Wayne City	Wayne.
Garrison, H. E	Dixon	Lee.
Gary, I. C	Chicago	Cook.
Gates, W. S	Chicago	Cook.
Geddy, W. H	Ohlman	Montgomery.
Gentles, H. W	Chicago	Cook.
German, W. H	Morgan Park	Cook.
Giles, H. W	Wataga	Knox.
Gillis, F. P	DuQuoin	Perry.
Goble, E. T	Earlville	La Salle.
Goldspohn, Albert	Chicago	Cook.
Gordon, J. H	Pocahontas	Bond.
Gordon, W. P	Carlyle	Clinton.
Graham, D. W	Chicago	Cook.
Grayson, W. H	Madison	Madison.
Green, F. L	Kangley	La Salle.
Green, Albert	Rockford	Winnebago.
Greene, F. C	Chicago	Cook.
Gregory, L. L	Chicago	Cook.
Griffith, B. B	Springfield	Sangamon.
Grim, A	Franklin Grove	Lee.
Guthrie, Hugh R	Sparta	Randolph.
Guthrie, W. E	Bloomington	McLean.
Hagler, E. E	Springfield	Sangamon.
Haines, G. M	Durand	Winnebago.
Hairgrove, J. W	Jacksonville	Morgan.
Halbert, W. A	Salisbury	Sangamon.
Hale, J. I	Anna	Union.
Hall, C. W	Kewanee	Henry.
Hall, F L	Perry	Pike.
Hall, Joseph	Westfield	Clarke.
Halstead, A. E	Chicago	Cook.
Hamilton, J. B	Chicago	Cook.
Hanna, W. M	Lisbon	Kendall.
Hardie, T. M	Chicago	Cook.
Hardy, H. T	Kaneville	Kane.
Harmison, D. C	Bath	Mason.
Harmon, J. C	Rantoul	Champaign.
Harris, M. L	Chicago	Cook.
Harrison, H. M	Quincy	Adams.

NAME.	POST OFFICE.	COUNTY.
Harsha, W. M	Chicago	Cook.
Harter, I. F	Stronghurst	Henderson.
Harvey, L. J	Griggsville	Pike.
Haskell, W. A	Alton	Madison.
HATCH, H	Quincy	Adams.
Hatheway, E. P	Ottawa	La Salle.
Hatheway, J. C	Ottawa	La Salle.
Haynes, Baxter	Coffeen	Montgomery.
Haynes, M	Bingham	Fayette.
Hayward, C. E	Cropsey	McLean.
Heflin, H. N	Kewanee	Henry.
Heise, Ellen H	Canton	Fulton.
Hendricks, S. O	Henry	Marshall.
Henrotin, F	Chicago	Cook.
Henry, R. H	Peotone	Will.
Hensley, J. W	Peoria	Peoria.
Hequembourg, J. E	Chicago	Cook.
Herrick, J. B	Chicago	Cook.
HERRIOTT, E. L	Jacksonville	Morgan.
Hill, G. E	Modesto	Macoupin.
Hoadley, A. E	Chicago	Cook.
Hobart, J. R	Ashmore	Coles.
Hoffman, J. A	Pesotum	Champaign.
Hoffman, J. R	Chicago	Cook.
Hoit, J. D. C	Elmwood	Peoria.
Hole, Burton W	Tallula	Menard.
HOLLISTER, J. H	Chicago	Cook.
HOLMES, E. L	Chicago	Cook.
Hollowbush, J. P	Rock Island	Rock Island.
Hood, E. M	Mason City	Mason.
Hooper, H	Chicago	Cook.
Hoornbeck, N. B	Youngstown	Warren.
Hopkins, J. N	Burnt Prairie	White.
Horrell, C. B	Colchester	Fulton.
Hotz, F. C	Chicago	Cook.
Howland, E. D	Lockport	Will.
Huber, J	Pana	Christian.
Huff, O. N	Chicago	Cook.
Hughes, N. J	Waverly	Morgan.
Hull, M. D	Bloomington	McLean.
HUNT, C. C	Dixon	Lee.
Hunt, Lawrence	Chicago	Cook.
Hurst, S. T	Greenview	Menard.
Hutchins, W. A	Orangeville	Stephenson.
Hyde, J. N	Chicago	Cook.
*INGALS, E. FLETCHER	Chicago	Cook.
*INGALS, EPHRIAM	Chicago	Cook.
Isham, Geo. S	Chicago	Cook.
ISHAM, R. N	Chicago	Cook.
Ives, Augustus	Farm Ridge	La Salle.
Jay, Milton	Chicago	Cook.
JENKS, D. S	Plano	Kendall.

NAME.	POST OFFICE.	COUNTY.
Johnson, C. G	Galesburg	Knox.
Johnson, Chas. B	Champaign	Champaign.
Johnson. F. S	Chicago	Cook.
Johnson, Geo. W	Chicago	Cook.
Johnson, Otis	Quincy	Adams.
Johnstone, Stuart	Chicago	Cook.
Jones, H. C	Decatur	Macon.
JONES, S. J	Chicago	Cook.
Jump, D. W	Plainfield	Will.
Kanne, A. J	Peoria	Peoria.
Keefer, J. F	Sterling	Whiteside.
Keefer. Jane Reid	Sterling	Whiteside.
Keller, Wm	Princeton	Bureau.
Kelly, M. W	Joliet	Will.
Kennellay, J. S	Easton	Mason.
Kerr, Chas	Springfield	Sangamon.
Kerr, R. A	Peoria	Peoria.
Kirby, W. H	Chestnut	Logan.
Knapp, A. A	Brimfield	Peoria.
Knappenberger, H	Macomb	McDonough.
Knight, Mary C	Aurora	Kane.
Knoblauch, J. I	Metamora	Franklin.
Knodle, E A	Beardstown	Cass.
Kreider, Geo. N	Springfield	Sangamon.
Kreissl, F	Chicago	Cook.
Kuh, E. J	Chicago	Cook.
Kunz, Sylvan	Chicago	Cook.
Landis, B. F	Tiskilwa	Bureau.
Law, D. H	Dixon	Lee.
Leahy, M. M	Anaconda, Mont	
Lee, E. H	Chicago	Cook.
Leeds, H. M	Allendale	Wabash.
Leeds, L. L	Lincoln	Logan.
Legier, J. T	Keensburg	Wabash.
Leland, K. W	Utica	La Salle.
LeMatty, J. B	New Philadelphia	Cass.
Lemen, E. C	Upper Alton	Madison.
Lemen, H. R	Upper Alton	Madison.
Le Sage, Philip	Joliet	Will.
LESTER, G. B	Oswego	Kendall.
Lewis, Denslow	Chicago	Cook.
Lewis, R. E	Macomb	McDonough.
Lindsay, V. T	Springfield	Sangamon.
Linn, E. C	Monmouth	Warren.
Little, J	Bloomington	McLean.
LITTLEFIELD, H. H	Beardstown	Cass.
Long, H. H	Orion	Henry.
Looker, O. W	Hillsdale	Rock Island.
Loomis, E. B	Chicago	Cook.
LORD, F. H	Plano	Kendall.
Lowe, F. O	Kewanee	Henry.

NAME.	POST OFFICE.	COUNTY.
Lydston, G. F.	Chicago	Cook.
Lyman, H. M.	Chicago	Cook.
Lytle, J. P.	Princeton	Bureau.
Mackey, A. N	Aledo	Mercer.
Maley, W. H	Galesburg	Knox.
Mammen, E.	Bloomington	McLean.
Manley, P. G	Mt. Carmel	Wabash.
Marshall, J. A	Pontiac	Livingston.
Martin, F. H	Chciago	Cook.
Martin, W. S	Tuscola	Douglas.
Matheny, R. C	Galesburg	Knox.
Mather, H. H	Chicago	Cook.
Matthei, P. H	Chicago	Cook.
MATTHEWS, J. P	Carlinville	Macoupin.
Matthews, J. Palmer	Carlinville	Macoupin.
Matthews, Samuel A	Chicago	Cook.
Mattison, F. C. E	Pasadena, Cal.	
Maxwell, J. B	Mt. Carmel	Wabash.
Mayo, E. L	DeKalb	DeKalb.
McAnally, J. T	Carbondale	Jackson.
McArthur, L. L	Chicago	Cook.
McClanahan, J. B	Alexis	Warren.
McClanahan, J. M	Kirkwood	Warren.
McClanahan, W. S	Woodhull	Henry.
McClanahan, Z	Oneida	Knox.
McCormick, N. K	Normal	McLean.
McCullough, J. R	Chicago	Cook.
McIntosh, A. J	Allendale	Wabash.
McIntyre, C. J	Chicago	Cook.
McKennan, H	Paris	Edgar.
McKenzie, W. R	Chester	Randolph.
MCKINNEY, J. G	Barry	Pike.
McLaaghlin, W. K	Jacksonvllle	Morgan.
McLean, W. H	E. St. Louis	St. Clair.
MCMANN, W. W	Gardner	Grundy.
McMennamy, B. F	Bethany	Moultrie.
McMurray, R. J	Linn	Wabash.
McPherson, C. W	Hazelhurst	Whiteside.
McRaven, B. H	McClure	Alexander.
MCWILLIAMS, S. A	Chicago	Cook.
Melaik, Hattie	Kewanee	Henry.
Mergler, Marie J	Chicago	Cook.
Meyerovytz, M	Chicago	Cook.
Miller, A. D	Sullivan	Moultrie.
Miller, D. W	Gilman	Iroquois.
Miller, J. H	Pana	Christian.
Miller, J. S	Chicago	Cook.
Miller, Katherine	Lincoln	Logan.
Miller, R. B	Milbrook	Kendall.
Miller, T. W	Chicago	Cook.
Milligan, Ella Fitch	Ottawa	La Salle.
Milligan, G. W	Edinburg	Christian.

NAME.	POST OFFICE.	COUNTY.
Miner, James	Winchester	Scott.
Mitchell, E. L	Roseville	Warren.
Mitchell, H. C	Carbondale	Jackson.
*MITCHELL, R. J	Girard	Macoupin.
Montgomery, E. B	Quincy	Adams.
Montgomery, F. H	Chicago	Cook.
Montgomery, W. T	Chicago	Cook.
Morgan, E. A	Decatur	Macon.
Morgan, J. W	Moline	Rock Island.
Morris, E. V. D	Galesburg	Knox.
Morton, A. J	Elmwood	Peoria.
Morton, J. S	Vernon	Marion.
Moyer, H. N	Chicago	Cook.
Moyer, M. L	Hillsboro	Montgomery.
Mudd, W. A	Athens	Menard.
Munson, S. E	Springfield	Sangamon.
Murfin, J. W	Vernon	Marion.
Murfin, W. W	Patoka	Marion.
Murphy, J. B	Chicago	Cook.
Murphy, T. C	Manito	Mason.
Myers, J. C	Clinton	DeWitt.
Myers, J. F	Rock Island	Rock Island.
Myers, W. F	Coal Valley	Rock Island.
Nance, Willis O	Chicago	Cook.
Nash, F. W	Big Rock	Kane.
Nelms, J. N	Taylorville	Christian.
Nelson, D. T	Chicago	Cook.
Nesbitt, G. W	Sycamore	DeKalb.
Nevill, F. A	Meredosia	Morgan.
Newcomer, I	Petersburg	Menard.
Newcomer, J. W	Petersburg	Menard.
Newman, H. P	Chicago	Cook.
Nixon, M. G	Columbia	Monroe.
Noble, C. M	McLean	McLean.
Noble, W. L	Chicago	Cook.
Norbury, F. P	Jacksonville	Morgan.
Norris, A. L	Farmer City	DeWitt.
Novak, F. J	Chicago	Cook.
Ochsner, Edward	Chicago	Cook.
Oliver, E. W	Wenona	Marshall.
O'Malley, W. H	Kinsman	La Salle.
Ormsby, O. B	Murphysboro	Jackson.
Ospray, Joan A	Dunning	Cook.
Oughton, C. M	Chicago	Cook.
Owens, D. W	Hersman	Brown.
Owens, E. B	Dixon	Lee.
Owens, Hattie M	Princeton	Bureau.
OWENS, J. E	Chicago	Cook.
Owen, W. R	Sublette	Lee.
Oyler, P. H	Mt. Pulaski	Logan.
Pace, J. T	Breese	Clinton.

NAME.	POST OFFICE.	COUNTY.
Palmer, A. E	Morris	Grundy.
Palmer, C. A	Princeton	Bureau.
Palmer, E. E	Ottawa	La Salle.
PARK, CEPHAS	Oquawka	Henderson.
Parke, C. R	Bloomington	McLean.
Parkhurst, F. J	Danvers	McLean.
Patrick, H. T	Chicago	Cook.
Patton, Ella M	Quincy	Adams.
Peairs, G. M	Joliet	Will.
Percy, J. F	Galesburg	Knox.
Peterson, Reuben	Chicago	Cook.
Pettit, J. W	Ottawa	La Salle.
Pierce, N. H	Chicago	Cook.
Pitner, F. R	Clay City	Clay.
PITNER, T. J	Jacksonville	Morgan.
PLUMMER, S. C	Rock Island	Rock Island.
Pogue, Jos	Edwardsville	Madison.
Preble, R. B	Chicago	Cook.
Prescott, H. V	Dallas City	Hancock.
Price, Cyrus	Eaton	Crawford.
Price, O. J	Chicago	Cook.
Prince, A. E	Springfield	Sangamon.
Prince, J. A	Springfield	Sangamon.
Prince, L. H	Chicago	Cook.
Putney, W. G	Serena	La Salle.
Quales, N. T	Chicago	Cook.
Quine, W. E	Chicago	Cook.
Rabe, W. L	Dwight	Livingston.
READ, N. S	Chandlerville	Cass.
Reagin, C. G	DuQuoin	Perry.
Reasoner, R. W	Morrisonville	Christian.
Reynolds, A. R	Chicago	Cook.
Rhodes, J. E	Chicago	Cook.
Rice, Delia M	Galesburg	Knox.
Rice, Geo. H	Sandoval	Marion.
Richards, W. M	Joliet	Will.
Ries, Emil	Chicago	Cook.
Rivard, G. J	Assumption	Christian.
Robbins, Jos	Quincy	Adams.
Robbins, M. M	Aurora	Kane.
ROBINSON, F. C	Wyanet	Bureau.
Robinson, J. A	Chicago	Cook.
Robinson, L. F	Ullin	Pulaski.
Rockey, A. P	Assumption	Christian.
Rogers, H. H	Kankakee	Kankakee.
Rooney, A. F	Quincy	Adams.
Root, Eliza H	Chicago	Cook.
Roskoten, O. J	Peoria	Peoria.
Ross, G. W	Carrollton	Green.
Ryon, L. R	Galesburg	Knox.
Sala, E. M	Rock Island	Rock Island.

NAME.	POST OFFICE.	COUNTY.
Salter, Allen	Lena	Stephenson.
Sargent, A. M	Lincoln	Logan.
Scherer, E. A.	E. St. Louis	St. Clair.
Schmidt, F. W	Riverdale	Cook.
Schmidt, O. L.	Chicago	Cook.
Schneck, Jacob	Mt. Carmel	Wabash
Scott, T. A.	Chicago	Cook.
Seeley, W. J	Redbud	Randolph.
Senn, E. J	Chicago	Cook.
Senn, Nicholas	Chicago	Cook.
Sennott, J. S	Waterloo	Monroe.
Servoss, A. G	Havana	Mason.
Shallenberger, W. E	Canton	Fulton.
Sharp, W. W	New Douglas	Madison.
Shaw, A. M.	Ottawa	La Salle.
Sherman, W. P.	West Pullman	Cook.
Sherrick, C	Monmouth	Warren.
Sibley, C. W.	Fairfield	Wayne.
Sippy, B. W	Chicago	Cook.
Skinner, Cynthia A	Monmouth	Warren.
Slater, Katherine	Aurora	Kane.
Smith, C. E	Palmyra	Macoupin.
Smith, C. F	Kankakee	Kankakee.
Smith, Lee	Bloomington	McLean.
Smith, W. H. C	Godfrey	Madison.
Snow, F. H	Chadwick	Carroll.
Soule, C. E	Sheridan	La Salle.
Southwick, G. E.	Cotton Hill	Sangamon.
Sparling, W. H.	Moweaqua	Christian.
SPEAR, J. W	Mason City	Mason.
Spear, L. E	Shirley	McLean.
Speed, J. N	Rushville	Schuyler.
Staff, E. P.	Ramsey	Fayette.
Standley, Emma B	Alexis	Warren.
Standley, J. W	Alexis	Warren.
Starkey, H. M	Chicago	Cook.
Starkweather, R. E	Chicago	Cook.
Stealy, J. H	Freeport	Stephenson.
Sterrett, W. S	Marseilles	La Salle.
Steele, D. A. K	Chicago	Cook.
Stehman, H. B	Chicago	Cook.
Stephenson, B. M.	Kilbourne	Mason.
Stericker, G. F	Springfield	Sangamon.
Stewart, H. J	Viola	Mercer.
Stewart, J. H.	Exeter	Scott.
STEWART, J. T.	Peoria	Peoria.
St. John, Leonard	Chicago	Cook.
Stoops, Perry H	Ipava	Fulton.
Stowell, J. H.	Chicago	Cook.
Stremmel, S. C	Macomb	McDonough.
Stringfield, C. P.	Chicago	Cook.
Studer, Jos	Peoria	Peoria.

NAME.	POST OFFICE.	COUNTY.
Sullivan, G. C	Cairo	Alexander.
Sutton, D. M	Peoria	Peoria.
Sutton, J. E	Canton	Fulton.
Sweetland, W. M	Highland Park	Lake.
Taggert, Gray	Galesburg	Knox.
Taylor, John F	Canton	Fulton.
Taylor, L. C	Springfield	Sangamon.
Thomas, A. L	Chicago	Cook.
Thomas, Chas. D	Peoria	Peoria.
THOMPSON, L. G	Lacon	Marshall.
Thompson, P. C	Jacksonville	Morgan.
Thompson, T. W	Oskaloosa	Clay.
Thompson, Wm	Kansas City, Mo	
Tieken, J. D	Piper City	Ford.
Tobias, G. J	Chicago	Cook.
Todd, J. F	Chicago	Cook.
Tombaugh, L. H	Milburn	Lake.
Tope, J. W	Oak Park	Cook.
Trout, E. H	Oak Park	Cook.
Troutt, J. J	Nashville	Washington.
True, Chas	Kankakee	Kankakee.
Trumbower, M. R	Sterling	Whiteside.
Tuck, W. O	Plymouth	Hancock.
Tully, F. E	Granite City	St. Clair.
Turck, F. B	Chicago	Cook.
Turner, B. S	Chicago	Cook.
Turner, F. A	Magnolia	Putnam.
Tuttle, H. H	Springfield	Sangamon.
Tweddale, Jas	Washburn	Woodford.
Tyler, J. H	Clinton	DeWitt.
Tyler, W. R	San Jose	Mason.
Uran, B. F	Kankakee	Kankakee.
Van Hook, Weller	Chicago	Cook.
Van Horn, A. K	Jerseyville	Jerseyville.
Vertrees, C. M	Murrayville	Morgan.
Wagner, J. R	Newman	Douglas.
Walker, J. B	Effingham	Effingham.
Walker, S. R	Chebanse	Kankakee.
Walsh, W. E	Morris	Grundy.
WARE, LYMAN	Chicago	Cook.
Warner, A. L	Kankakee	Kankakee.
Watkins. Thos. J	Chicago	Cook.
Watts, E. L	Triumph	La Salle.
Watson, Walter	Mt. Vernon	Jefferson.
Waugh, W. F	Chicago	Cook.
Weaver, Geo. H	Chicago	Cook.
Weber, Geo. T	Ingraham	Clay.
Webster, G. W	Chicago	Cook.
Webster, J. C	Chicago	Cook.
WEBSTER, J. R	Monmouth	Warren.

NAME.	POST OFFICE.	COUNTY.
Weidner, M. R	Dalton	Cook.
Weis, E. W	Ottawa	La Salle.
Weir, John	West Union	Crawford.
Weir, L. J	West York	Crawford.
West, W. C	Geneseo	Henry.
Westcott, C. D	Chicago	Cook.
Westgate, Letitia A	Sycamore	DeKalb.
Wheeler, E. H	Murphysboro	Jackson.
White, S. C	Sandwich	DeKalb.
WHITE, J. L	Bloomington	McLean.
Whitley, J. T	Petersburg	Menard.
Whitmire, J. W	Forest	Livingston.
Whitmore, B. T	New York, N. Y	
Whitten, H. H	Peoria	Peoria.
Whitten, T. J	Nokomis	Montgomery.
Whitlock, J. T	Dix	Jefferson.
Wiener, Alex	Chicago	Cook.
Wiggins, J. L	E. St. Louis	St. Clair.
Wilcox, G. G	Seneca	La Salle.
Wilcox, J. M	Clinton	DeWitt.
Wilcox, S. H	Shattuck	Clinton.
Wilder, W. H	Chicago	Cook.
Wiley, F. A	Earlville	La Salle.
Wilhelmj, C. F	E. St. Louis	St. Clair.
Wilson, W. G	Shelbyville	Shelby.
Will, O. B	Peoria	Peoria.
Willetts, A. P	Keithsburg	Mercer.
Wills, John	Beecher City	Effingham.
WILLARD, E. R	Wilmington	Will.
Williams, J. F	Chicago	Cook.
Williams, Chas. H	Boston, Mass	
Williamson, M. F	Joliet	Will.
Wilson, R. M	Lincoln	Logan.
Wing, Elbert	Chicago	Cook.
Winn, C. A	Chesterfield	Macoupin.
Winslow, F. C	Jacksonville	Morgan.
Wood, Casey A	Chicago	Cook.
Woodruff, H. W	Joliet	Will.
Woodworth, P. M	Chicago	Cook.
WRIGHT, JOHN	Clinton	DeWitt.
Zook, E. W	Dunlap	Peoria

LIST OF MEMBERS IN ATTENDANCE AT THE GALESBURG MEETING.

[IN ORDER OF REGISTRATION.]

J. M. G. Carter.....Waukegan.
Edmund W. Weis..Ottawa.
C. M. Vertrees.....Murrayville
John G. McKinney.Barry.
Arthur R. Edwards.Chicago.
A. C. Corr.....Carlinville.
D. R. Brower.....Chicago.
Jas. O. DeCourcy...E. St. Louis.
Frank P. Norbury..Jacksonville.
H. W. Chapman....Whitehall.
T. J. Pitner.....Jacksonville.
H. W Smith.....Roodhouse.
J. W. Hairgrove....Jacksonville.
J. N. Speed.....Rushville.
E. A. Knodle.....Beardstown.
H. A. Chapin.....Whitehall.
Emil Ries.....Chicago.
Henry Redlich.....Chicago.
Isaac A. Abt.....Chicago.
Wm. O. Ensign.....Rutland.
James B. Herrick...Chicago.
Joseph L. Miller....Chicago.
Edward H. Ochsner.Chicago.
Bertram W. Sippy..Chicago.
L. R. Ryan.....Galesburg.
C. F. Wilhelmj.... E. St. Louis.
J. F. Myers.....Rock Island.
Florence W. Hunt..Chicago.
F. H. Snow .....Chadwick
Geo. W. Cox.....Chicago.
T. W. Davidson....Galesburg.
Ellen H. Heise.....Canton.
Harry J. Stewart...Viola.
Katharine Miller...Lincoln.
O. B. Will.....Peoria.
W. H. Conibear....Morton.
Eliza H. Root.....Chicago.
C. L. Carroll.....Taylorville.
H. H. Whitten.....Peoria.
Ralph C. Matheny..Galesburg.
J. Neil Cox.....N.Henderson.
Chas. B. Johnson...Champaign.
C. F. Brodway.....Abingdon.
Emma B. Standley. Alexis.
Geo. F. Butler .....Chicago.
Delia M. Rice .....Galesburg.
J. E. Cowan.....Galesburg.
E. M. Patton.....Quincy.
W. H. Maley.....Galesburg.
Joseph Robbins ....Quincy.
H. N. Boshell .....Melvin.
J. R. Wagner.....Newman.
J. F. Percy.....Galesburg.
Gray Taggert .....Galesburg.
H. W. Waterous ...Galva.
Hugh T. Patrick....Chicago.
Geo. P. Powell.....La Harpe.
Edgar Bolles.....Macomb.
R. E. Lewis.....Macomb.
C. B. Horrell.....Colchester.
E. L. Mitchell.....Roseville.
C. H. Kemp.....Colchester.

L. A. Burr.....Knoxville.
Z. H. McClanahan..Oneida.
C. G. Johnson.....Galesburg.
J. F. Dicus.....Streator.
C. E Price.....Eaton.
G. S. Bower.....Ransom.
H. S. Worthley....Elwood.
Marion K. Bowles..Joliet.
Frances Dickenson.Chicago.
E. W. Oliver.....Wenona.
R. B. Smead.....Altona.
J. A. Menoher.....Lawn Ridge.
J. W. Pettit.....Ottawa.
E. H. Butterfield....Ottawa.
A. C. Cotton.....Chicago.
George W. Johnson.Dunning.
J. Homer Coulter...Chicago.
Willis O. Nance....Chicago.
Mary C. Hollister...Chicago.
D. W. Graham.....Chicago.
Wm. S. Gates.....Chicago.
Jno. G. Poole.....Galesburg.
E. P. Cook.....Mendota.
J. R. McCullough..Chicago.
Arthur R.Reynolds Chicago.
Chas. C. Hunt.....Dixon.
Hattie B. Melach...Kewanee.
Alex. C. Wiener....Chicago.
Weller Van Hook..Chicago.
Henry F. Lewis....Chicago.
Denslow Lewis.....Chicago.
G. W. Nesbitt.....Sycamore.
ChaunceyH.Wilder DeKalb.
Geo. N. Lucas.....Malta.
J. L. Shepard.....Galesburg.
Franklin Potts.....Galesburg.
Sam'l A. Matthews.Chicago.
D. W. Jump .....Plainfield.
G. M. Peairs.....Joliet.
A. M. Earel.....Abingdon.
H. V. Prescott.....Dallas City.
W. H. Scott.....Dallas City.
P. H. Oyler.....Mt. Pulaski.
J. N. Black.....Clayton.
W. S. McClanahan.Woodhull.
Thos. A. Dicks.....Broadlands.
T. W. Burrows.....Ottawa.
A. M. Beale.....Moline.
Geo. L. Limmer....Peoria.
Ben. J. Downey....Ottawa.
M. S. Marcy.....Peoria.
Warren Sutliff.....Peoria.
M H. Blackburn...Dover.
E. E. Sargent .....Leroy.
Jas. E. Sutton.....Canton.
W.E.Shallenberger.Canton.
C. W. Hall.....Kewanee.
T. C. Murphy.....Manito.
John F. Taylor.....Buda.
R. J. Grigorn.....Augusta.
E. M. Sutton.....Peoria.
C. Du Hadway.....Jerseyville.
Archibald J.Norton.Elmwood.
Carl E. Black .....Jacksonville.
J. F. Cooper.....Elmwood.
S. C. White.....Sandwich.
W. M. Catto .....Decatur.
L. E. Spear.....McClean.
J. M. McClanahan..Kirkwood.
W. L. Baum .....Chicago.
L. L. McArthur....Chicago.
Henry T. Byford...Chicago.
Letitia A.Westgate.Sycamore.
J. A. Egan.....Springfield.
G. N. Kreider.....Springfield.
John H. Hollister ..Chicago.
J. C. Sullivan.....Cairo.
W. H. Garrison....Pearl.
A. H. Byers.....New Salem.
H. W. Woodruff....Joliet.
W. B. Stewart.....Joliet.
Chas. D. Center.....Quincy.
B. F. Hamilton.....Roseville.
A. I. Bouffleur .....Chicago.
J. T. McAnally.....Carbondale.
Sanger Brown.....Chicago.

W. S. Caldwell.....Freeport.
Franklin H. Martin.Chicago.
Joseph B. Bacon....Chicago.
J. E. Coleman.....Canton.
C. J. Eads.....Oquawka.
W. S. Sterritt.....Marseilles.
Jacob Frank .....Chicago.
Harold N. Moyer...Chicago.
Sylvan Kunz.....Chicago.
S. C. Plummer.....Rock Island.
Everett J. Brown...Decatur.
Perry H. Stoops....Ipava.
Amos W. Ball.....Rushville.
B. F. Uran..... ...Kankakee.
H. H. Littlefield....Beardstown.
R. I. Law.....Galesburg.
Chas. D. Thomas...Peoria.
J. W. Hensley.....Peoria.
Al. J. Kanne.....Peoria.
A. P. Willits.....Keithsburg.
E Bernreuter.....Mt. Olive.
N. B. Crawford ....Eureka.
S. C. Stremmel.....Macomb.
S. S. Clayberg.....Avon.
J. P. Roark .....Bushnell.
Philip Le Sage.....Joliet.
J. W. Standley.....Alexis.
G. L. Eyster .....Rock Island.
A. S. Slater.....Wataga.
M. W. Cushing.....Joliet.
W. S. Halliday.....Monmouth.
T. E. Wallace.....Monmouth.
J. C. Kilgore.....Monmouth.
Emory Lanphear...St. Louis.
I. F. Harter .....Stronghurst.
Robt H. Babcock..Chicago.
R. M. C. Ball.....Monmouth.
Alfred J. Baxter....Astoria.
Wm. Keller.....Princeton.
N. B. Hoornbeck...Youngstown.
A. A. Knapp.....Brimfield.
W. R. Owen.....Sublette.
S. Prescott Ayer ...Kewanee.
H. Knappenberger .Macomb.
J. A. Kirkland.....Cambridge.
B. G. Kimmel.....Monmouth.
J. W. Van Winkle..Chicago.
H. W. Giles.....Wataga.
I. R. Webster.....Monmouth.
Mrs. J. A. Shreck ..Cameron.
S. McRill.....Victoria.
Roy Sexton.....Streator.
A. G. Patton.....Monmouth.
C. E. Colwell.....Aurora.
E. C. Linn.....Monmouth.
John P. Matthews..Carlinville.
Henry P. Newman..Chicago.
M. L. Harris.....Chicago.
J. E. Best.....Arlington Heights.
A. E. Halstead.....Chicago.
H. N. Heflin.....Kewanee.
W. D. Chrisman....Lafayette.
W. D. Hohmann ...Kewanee.
J. H. Mannon.....Kewanee.
Geo. I. Rice.....Princeton.
J. P. McClanahan..Alexis.
J. S. Aisthorpe.....Cairo.
N. B. Thistlewood. Cairo.
L. P. Parker .....Cairo.
P. W. Barclay.....Cairo.
F. P Tyler.....Galesburg.
W. H. Cole .....Kewanee.
J. R. Hollowbush ..Rock Island.
H. H. Gardner.... Moline.
John A Robison....Chicago.
Wm M Harsha....Chicago.
C. W. Hunter.....Victoria.
Warren Hunter ....Hampton.
D. W. Aldrich.....Galesburg.

PROCEEDINGS

OF THE

FORTY-EIGHTH ANNUAL MEETING.

—THE—

ILLINOIS STATE MEDICAL SOCIETY

Proceedings of the Forty-Eighth Annual Meeting

—HELD AT—

GALESBURG, ILL., MAY 17th, 18th AND 19th, 1898.

FIRST DAY—MORNING SESSION.

THE ASSOCIATION met in the Court House and was called to order by the President, Dr. J. M. G. Carter, of Waukegan, at 10 A. M.

Prayer was offered by the Rev. W. H. Geistweit, pastor of the First Baptist church.

At the conclusion of the prayer, President Carter introduced the Hon. F. F. Cooke, Mayor of Galesburg, who delivered the following

ADDRESS OF WELCOME.

Mr. President and Members of the Illinois State Medical Society: The citizens of Galesburg, since it was determined that the meeting of this Society for 1898 would be held in our city, have waited anxiously the arrival of the time when they should have the opportunity of entertaining you and showing their appreciation of the honor of acting as hosts to so distinguished an association of professional men. I take

it that the known character of the community will best determine for visitors the sincerity of the welcome that they will experience, or that they may hear from the lips of him who is authorized to express such sentiments. The city of Galesburg we confidently believe has established for herself a widespread and general reputation among the communities of the great Northwest for appreciation and affiliation with moral, intellectual and educational advancement, more than any of the communities that rival us in population. The spirit that leads men to be satisfied better with educational and intellectual accumulations than with accumulations of wealth seems to have a firmer footing in all classes of our people than in any of the surrounding communities that equal us or exceed us in population. If, then, there be anything in congenial surroundings and associations that may aid in the success or joy of this occasion, we believe that you have it to its fullest extent in the city of Galesburg. I preface this bit of evidence that you may realize the joy we feel in having an opportunity of entertaining you and welcoming you upon this occasion.

We are all infinitely proud of the great State of Illinois. The name of Illinois, and anything that calls forth the name of Illinois, fills our hearts with patriotic emotions. Illinois is great—great in its climate; great in the fertility of its soil; great in its natural resources; great in the enterprise and vigor of its people; great in its professional men; great in its lawyers, its clergymen, its scholars, its physicians; great in the moral and intellectual character of its people, and of all the States of this grand Union of States, it is great in its medical celebrities and in its medical educational opportunities. Without disparagement to any of the other learned professions, and without any detraction from the merits of the profession of which I myself am a member, I believe the State of Illinois has gained a higher distinction than any other

State among the great and scientific men of the world by and through the quiet and unostentatious efforts of its medical profession. Our physicians have been to the medical councils of the old world and have brushed away the mistaken idea that the great West was simply wild and woolly, and in no sense the seat of profound medical learning. Among the medical ideals of the old world our physicians have commanded respect and consideration. They have added lustre to the profession and added to our intellectual, educational and scientific glory. Will I be accused of flattery, or of exceeding the limits to which a public speaker may go, when I say that in no country in the land can there be found greater medical celebrities than in the great State of Illinois? Where shall we place upon the medical roll of fame of the world the names of Senn, of Murphy, of Davis, of Klebs, of Fenger, of Byford, and many others whose names are worthy to be mentioned, and who are entitled to be called the Darwins and the Tyndalls of the western hemisphere; and with our medical institutions, such as Rush Medical College, the College of Physicians and Surgeons, the Woman's Medical School, and other institutions of like importance. The young men and young women of our country to-day receive as polished and profound a medical education as in any of the universities of the old world. Certainly a review of medicine adds to the glory of Illinois and the greatness of this Association. The members of the profession from Illinois have made as distinguished contributions as any other country to the fund of medical knowledge along the lines of practical work for the general practitioner of medicine and surgery, and that are of inestimable benefit to humanity. Discoveries and inventions that have relieved human suffering and prolonged human life stand to the credit of the Illinois physicians. The contributions of Illinois physicians to the medical literature of

the world have excited the enthusiasm of advanced medical writers and thinkers the world over, and have earned for them international reputations. No profession, in my judgment, has such opportunities for good; no profession has made more wonderful advancement or has done so much toward the advancement of practical knowledge that shall be of practical benefit to the masses. Twenty-five years have wrought wonders for medicine, in that medical science has been practically revolutionized. Cures have been effected that were thought to be beyond human skill. People suffering from sepsis have been rescued from death, until it would seem that every human sufferer may have ground for hope.

Gentlemen, this occasion is exceedingly pleasant to the citizens of Galesburg. My memory does not recall the visit of a more important association to our city. Naturally the minds of our people are excited to a high degree of satisfaction. We shall strive to make your visit pleasant, so that when you return to your homes you may carry with you good tidings of us and retain pleasant recollections of our city. In the name of the people, I thank you for the honor you have conferred upon us, and again I heartily welcome you to our handsome city. (Applause.)

RESPONSE TO THE ADDRESS OF WELCOME.

President Carter: Honorable Sir: In response to your very cordial invitation, and in behalf of the Illinois State Medical Society, I desire to thank you for your cordial invitation and your eloquent words in commendation of our profession. We were pleased when we learned that our meeting was to be held in your beautiful city, because we knew something of its reputation for hospitality, for its intelligence and for high culture. We are therefore highly pleased at being here. Again, I thank you in behalf of the Society

for your cordial welcome, and we shall expect during the time we are here to enjoy the entertainments you have offered us. (Applause.)

REPORT OF THE EXECUTIVE COMMITTEE, THE PRESIDENT, EX-OFFICIO CHAIRMAN.

President Carter made the following verbal report of this Committee :

A meeting of the Executive Committee was held at the Great Northern Hotel in Chicago, October 14, 1897, to make arrangements for the year's work. Nearly all of the members of the Committee were present. The meeting was a very harmonious one and the plan of work outlined was adopted by unanimous consent. It was decided to invite the entire profession of the State to attend the sessions of 1898, and to have this matter attended to by the Secretary and Committee of Arrangements.

The Chairmen and Secretaries of the various sections were alive to the interests they represented as you will see by looking at the program, and they have done their work well. For special reasons it was thought wise to change the order of sections this year, calling Section Three before Section Two. We felt that this order would not interfere with the harmonious work of the Society, and would add materially to the interest of Section Three. Every member of the Committee has done active work, and the Chairman desires to thank them individually for the lively interest they have taken in the success of this meeting, and for the uniform courtesy to him in rendering needed assistance.

On motion, the report was adopted.

THE PRESIDENT : The next thing in order is the report of the Committee of Arrangements.

The members of this Committee being absent the report was passed temporarily.

THE PRESIDENT: We will now listen to the report of the Committee on Registration, Dr. George N. Kreider, Chairman.

The Secretary stated that Dr. Kreider would not be present until Wednesday morning. The report was therefore postponed until his arrival.

Under the head of Miscellaneous Business, the Secretary read a communication from Dr. Wm. B. Atkinson, Secretary of the American Medical Association, with regard to the Rush Monument Fund, and stated that the delegation from the Illinois State Medical Society to the American Medical Association meeting last year in Philadelphia made pledges through Dr. Corr, and as Dr. Corr was present he would be able to explain the matter to the Society.

DR. A. C. CORR: As Chairman of the Committee on Delegation from the Illinois State Medical Society to the American Medical Association, I will explain what occurred at the Philadelphia meeting. There was a good deal of enthusiasm on that occasion relative to making contributions toward the Rush Monument Fund. Several States through their delegates pledged certain amounts. I being Chairman of the Illinois delegation, was prevailed upon by Drs. Murphy, Senn, Hamilton and others to make some kind of a pledge for our State Society, and so I arose in my seat and said, "I am authorized to say that Illinois will pledge herself to the extent of two thousand dollars." A great many of those who made pledges, after returning home, took the matter up with their State societies and had committees appointed for that purpose, and that is what we ought to do here. If any further explanation is required I shall be glad to give it.

THE PRESIDENT: This is a matter of considerable importance, and I think it would be wise to postpone its further consideration until some time later in the session. This was so done.

Dr. Corr: I wish to make a motion, Mr. President, for the instruction of the Chairmen of the different sections, that contributors of papers shall not be given an extension of time. I make this motion for the purpose of expediting business and giving every one a chance.

Seconded by Dr. Ensign and carried.

Dr. Corr: I also wish to move that the By-Laws be suspended in so far as they relate to each individual discussion, and that the time be limited to five minutes.

Seconded by Dr. Brower and carried.

There being no further business to come before the General Session, Section One was called to order by the Chairman, Dr. Arthur R. Edwards, of Chicago; Secretary, Dr. Frank P. Norbury, of Jacksonville.

SECTION ONE—FIRST SESSION.

Dr. Frank P. Norbury read a paper entitled "Malnutrition of Infants."

Dr. Frank S. Churchill, of Chicago, contributed a paper entitled "Modified Milk."

Dr. Isaac A. Abt, of Chicago, followed with a contribution on "Infantile Scurvy."

These three papers were discussed jointly by Drs. Root, Herrick, Pitner, and in closing by the essayists.

Dr. James B. Herrick, of Chicago, read a paper entitled "Some Points Concerning the Diagnosis of Pleurisy with Effusion, with Particular Reference to Misleading Physical Signs."

The discussion of this paper was postponed until the afternoon session.

In the absence of the Chairman of the Committee of Arrangements, Dr. D. W. Aldrich, owing to the death of a member of his family, Dr. Percy, a member of the Committee, made the following report:

Mr. President and Members of the Illinois State Medical Society: Tuesday evening, May 17th, the Society will be called to order at the Auditorium at 7:30 P. M. by the First Vice-President, Dr. T. J. Pitner, of Jacksonville. At this session there will be delivered the address of the President, by Dr. Carter, followed by music. Then will come the address on Medicine by Dr. James H. Etheridge, of Chicago, and following it the address on State Medicine by Dr. J. W. Pettit, of Ottawa. The address on Surgery will be delivered by Dr. Nicholas Senn, of Chicago.

Wednesday, May 18th, there will be chapel exercises at the Alumni Hall of Knox College at 8:30 A. M. The members of the Society are cordially invited to attend them. There will be a recital and informal reception for the visiting ladies at Lombard University at 10 A. M.; also a reception and musicale at Whiting Hall at 3 P. M., and a reception and annual dinner to the Society at 6:30 P. M. in the parlors of the Presbyterian church. Thursday morning the Society is invited to inspect the Galesburg Cottage Hospital. Thursday afternoon the Members of the Society are invited by the management of the brickyards east of the city to visit their respective plants.

Dr. O. B. Will, of Peoria, offered the following resolution, which was unanimously adopted:

WHEREAS, It has come to the knowledge of this Society that the Chairman of the present Committee of Arrangements, Dr. D. W. Aldrich, of this city, has within the past forty-eight hours met with a sad bereavement in the sudden death of a beloved daughter; therefore, be it

Resolved, That the Members of the Illinois State Medical Society, in forty-eighth annual session in the city of Galesburg, extend to their afflicted fellow, Dr. Aldrich and family their most heartfelt sympathy and commiseration in this their hour of sadness and sorrow.

Resolved, Further, that in pursuance of this spirit of kindred feeling and profound respect, the President of this Society be and is

hereby authorized and requested to appoint a Committee of six in addition to its resident members to officially represent it at the funeral ceremony on to-morrow.

On motion, the Society adjourned until 1:30 P. M.

FIRST DAY—AFTERNOON SESSION.

The Society re-assembled at 1:30 P. M. and was called to order by the President.

THE SECRETARY: I have here the application of the Medical Club of Jacksonville, which wishes to affiliate with this Society. We are assured that the Club is in complete harmony with the Constitution of this Society; but I believe it ought to be referred to the Judicial Council for final action.

On motion of Dr. Herrick, the matter was so referred.

SECTION ONE—SECOND SESSION.

The first thing in order was the discussion on Dr. Herrick's paper. The paper was discussed by Drs. Sippy, Miller, Edwards, and in closing by the essayist.

Dr. J. L. Miller, of Chicago, read a paper on the "Presence of Smegma Bacillus in the Urine and Its Staining Qualities."

Dr. Hugh T. Patrick, of Chicago, read a paper entitled "Remarks on the Treatment of Neurasthenia," which was discussed by Drs. Horrel, Brower, Norbury, and in closing by Dr. Patrick.

Dr. B. W. Sippy, of Chicago, contributed a paper on "The Significance of Certain Signs and Symptoms in Heart Insufficiency," which was discussed by Drs. Herrick, Coulter, and in closing by the essayist.

Dr. S. A. Matthews, of Chicago, contributed a paper entitled "A Pharmacological Study of the Action of Digitalis on the Mammalian Heart and Circulation."

This paper was discussed by Drs. Butler and Brower.

Dr. George F. Butler, of Chicago, read a paper on "The Untoward Action of Drugs, with Special Reference to Hypnotics and Antipyretics."

The paper was discussed by Dr. Cotton.

Dr. George W. Cox, of Chicago, read a paper on "Streptococcal Infection," which was discussed by Drs. Butler, Miller, Hairgrove, and in closing by Dr. Cox.

Dr. George W. Johnson, of Chicago, contributed a paper entitled "Observations on the Blood of Tubercular Patients," which was discussed by Dr. Cox.

Dr. H. W. Chapman, of Whitehall, read a short paper entitled "An Undescribed Form of La Grippe."

Dr. A. C. Cotton, of Chicago, followed with a paper on "Infant Feeding at Home and Abroad."

Dr. L. R. Ryan, of Galesburg, read a paper entitled "A Positive Antidote for Strychnia."

Dr. C. C. Hunt, of Dixon, read a paper on "Chelidonium Majus in Inoperable Carcinoma."

The President then called the Society in general session. He appointed the following members to attend the funeral service at the house of Dr. Aldrich: Drs. O. B. Will, T. J. Pitner, E. P. Cook, James B. Herrick, C. F. Wilhelmj and Joseph Robbins.

On motion the Society adjourned until 7:30 P. M.

FIRST DAY—EVENING SESSION.

The Society reassembled at 7:30 P. M. at the Auditorium, and was called to order by the First Vice-President, Dr. T. J. Pitner, of Jacksonville.

Upon the platform were the following Ex-Presidents of the Society: Drs. D. W. Graham, Daniel R. Brower, E. P. Cook, W. O. Ensign, O. B. Will and A. C. Corr.

The program for the evening was very pleasantly opened

with the rendition of a musical selection by the Knox Conservatory Orchestra.

Dr. Pitner introduced the President, Dr. Carter, who spoke upon "Advances in the Domain of Preventive Medicine."

Dr. J. W. Pettit, of Ottawa, delivered an address on "State Medicine."

In the absence of Dr. Nicholas Senn, of Chicago, who was to have delivered the address on Surgery, Dr. John H. Finley, of Knox College, was introduced and delivered a humorous address on the subject of "Intellectual Bacteriology."

The program closed with a brilliant rendition by the orchestra of the selection "Fest Overture."

SECOND DAY—MORNING SESSION.

The Society met at 9 A. M. and was called to order by the President.

The Secretary announced the Committee on Nominations as follows:

COUNTY MEDICAL SOCIETIES.

Champaign County Medical Society, Dr. T. A. Davis.
Douglas County Medical Society, Dr. J. R. Wagner.
Fulton County Medical Society, Dr. Shallenberger.
La Salle County Medical Society, Dr. J. F. Dicus.
Macoupin County Medical Society, Dr. A. C. Corr.
McDonough County Medical Society, Dr. R. E. Lewis.
Monroe County Medical Society, Dr. C. F. Wilhelmj.
Morgan County Medical Society, Dr. J. W. Hairgrove.
St. Clair County Medical Society, Dr. J. O. DeCourcy.
Tri-County Medical Society, Dr. Horatio N. Bushnell.
Warren County Medical Society, Dr. Sherrick.
Will County Medical Society, Dr. George Peirs.

CITY MEDICAL SOCIETIES.

Chicago Academy of Medicine, Dr. Emil Ries.
Chicago Gynecological Society, Dr. Weller Van Hook.
Chicago Medical Society, Dr. A. C. Cotton.
Chicago Medico-Legal Society, Dr. D. R. Brower.
Chicago Orthopedic Society, Dr. Alex C. Wiener.
Chicago Pathological Society, Dr. J. B. Herrick.
Decatur Medical Society, Dr. E. J. Brown.
East St. Louis Medical Society, Dr. J. L. Wiggins.
Galesburg Medical Society, Dr. Gray Taggert.
Jacksonville Medical Club, Dr. C. E. Black.
Neurological Society of Chicago, Dr. H. T. Patrick.
Ottawa City Medical Society, Dr. J. W. Pettit.
Peoria City Medical Society, Dr. A. J. Kanne.
Physician's Club, Dr. A. R. Reynolds.
Society Internal Medicine, Chicago, Dr. A. R. Edwards.
Society of Medical Examiners, Dr. Geo. F. Butler.

DISTRICT MEDICAL SOCIETIES.

Æsculapian Society of the Wabash Valley, Dr. C. B. Johnson.
Brainard District Medical Society, Dr. Catherine Miller.
Galva District Medical Society, Dr. W. S. McClanahan.
Iowa and Illinois Central District Medical Association, Dr. S. C. Plummer.
Med. and Surg. Soc. of Western Illinois; Dr. C. DuHadway.
Military Tract Medical Association, Dr. E. L. Mitchell.
North Central Illinois Medical Ass'n., Dr. E. P. Cook.
Rock River Valley Medical Society, Dr. F. H. Snow.
Southern Illinois Medical Association, Dr. J. C. Sullivan.

THE PRESIDENT: We will now listen to the report of the Committee on Publication.

REPORT OF COMMITTEE ON PUBLICATION.

To the President and Members of Illinois State Medical Society:

Your committee has the honor to report that they awarded the contract for printing six hundred of the last annual volume of the Transactions to the lower of four bidders, the Ottawa Free Trader Printing House, at a net price of $567.80.

Five hundred and fifteen volumes were delivered to members by express. Twenty volumes to the libraries of the public institutions of the State and exchanges with other Medical Societies.

One thousand programs were printed by the Ottawa Free Trader Printing Company at a cost of $18.00.

Your committee would like to call your attention to the remarkable reduction in the price of printing, as compared with that of former years, a reduction of over thirty-three and one-third per cent. in the price of printing the program.

Your committee beg leave to call your attention to the fact that notwithstanding the larger number of addresses and papers than usual that it contains, and that it is a hand bound volume, the Transactions were issued by the first of August.

In obedience to an order of the Executive Committee, there was prepared and sent to six thousand physicians of this State, in February, a preliminary program and a cordial invitation to join the Society.

A copy of the official program has been mailed to every member of the Society and to medical publicatinns of Chicago and St. Louis.

Your committee beg to report further that, acting upon the suggestion of a committee of the Chicago Medical Society and upon the special request of our President, the Secretary caused to be printed and addressed to members of this Society four hundred and fifty postal cards, urging a united action to prevent unwise legislation by the Senate and Congress.

Your committee further report that the chairman received from the retiring Secretary, Dr. John B. Hamilton, a total number of four hundred and sixteen volumes, of which he sent to members who had paid their arrearages: E. P. Gilles, DuQuoin, volumes '94, '95, '96; M. R. Doyle, East St. Louis, '95-'96; J. W. Newcomer, Petersburg, '96; H. M. Leeds, Allendale, '96; M. M. Leahy, Chicago, '95; J. S. Kennelly, Easton, '95, '96; J. W. Stanley, Alexis, '96; Moses Haynes, Bingham, '94, '95; C. W. Ward, Chicago, '96; A. C. Wiener, Chicago, '96; W. M. Cox, Mt. Sterling, '96; A. T. Bartlett, Virden, '96; and Adolph Gehrman, Chicago, '96.

Acting in accordance with a motion made in 1896, that members may receive copies prior to 1890 by paying expressage therefor, the chairman sent to Dr. Cox duplicate copies of '79, '82, '84, '85, '86, '87, and '89; and in pursuance of an order directing the sale to members of old volumes since and including 1890 at $1.00 each, he also sent volumes of 1890 and 1891 (for which there was remitted $2.00) which leaves a total number of volumes on hand to date, prior to the 1897 issue, of 373 volumes.

One copy of 1897 Transactions sold to Johnson & Johnson, $1.00.

One extra copy of 1897 Transactions sold to Dr. W. O. Ensign, $1.00.

One copy of 1897 Transactions sold to Dr. E. Engle, $1.00.

One extra copy of 1897 Transactions sold to Dr. G. W. Fringer, $1.00.

E. W. Weis, Chairman.

On motion report was adopted.

The Treasurer, Dr. George N. Kreider, of Springfield, read his report as follows:

REPORT OF THE TREASURER.

GEORGE N. KREIDER, Treasurer,
In account with the Illinois State Medical Society for the year 1897.

Dr.

To cash on hand May 19, 1897	$ 845 24
Receipted as per book No. 1	258 00
Receipted as per book No. 2	285 00
Receipted as per book No. 3	126 00
Receipted as per book No. 4	300 00
Receipted as per book No. 5	138 00
Receipted as per book No. 6	300 00
Received from Committee on Expert Testimony	215 65
TOTAL	$2,467 89

Cr.

Voucher No. 1, J. N. Dixon, apc. Expert Testimony	$ 215 65	
Voucher No. 2, F. R. Fry, apc. River Excursion	100 00	
Voucher No. 3, M. J. Mergler, excess dues ret'd	2 00	
Voucher No. 4, J. W. Pettit, Legislative Committee	10.75	
Voucher No. 5, E. W. Weis, Sec'y, Stationery	17 50	
Voucher No. 6, J. W. Pettit, Legislative Committee	19 20	
Voucher No. 7, E. W. Weis, Printing, Stenographer, Express, etc	791 58	
Voucher No. 8, J. L. Wiggins, Expenses E. St Louis Meeting	33 35	
Voucher No. 9, G. N. Kreider, Treas. Services	50 00	
Voucher No. 10, E. W. Weis, Sec'y Services	200 00	
Voucher No. 11. W. D. Wilson & Son, Printing	1 50	
Voucher No. 12, J. W. Pettit, Legislative Com	70 05	
Voucher No. 13, E. W. Weis, Printing	26 35	
Voucher No. 14, Stamps for Treasurer	12 00	
Voucher No. 15, Printing, Treasurer	7 25	
Certified Check to balance	910 71	
TOTAL		$2,467 89

Approved, May 18, 1898. T. J. PITNER, 1st Vice-President.
J. T. MCANALLY, 2d Vice-President.

On motion, this report was referred to Auditing Committee.

Dr. C. W. Hall, of Kewanee, read the report of the Committee on Medical Societies, as follows, which on motion was adopted :

REPORT OF THE COMMITTEE ON MEDICAL SOCIETIES.

Officers and Members of the Illinois State Medical Society :

The Committee on Medical Societies reports the following : The year's work has been most gratifying, and the results the best of any year since the organization of this Committee. Organized in 1892, the work by years has been :

In 1893, two medical societies were organized.
In 1894, } eight medical societies were organized.
In 1895, }
In 1896, one medical society was organized.
In 1897, one medical society was organized.
In 1898, sixteen medical societies were organized.

Eight of these were organized in the following counties: Lawrence, Gallatin, Fulton, White, McDonough, Warren, Vermillion and Hardin, and organizations are under consideration in Pope, Hamilton and Pulaski counties. We have planted seed in these counties, and are now looking for results. We surely expected to have them organized for this report, but were disappointed. Also the following city societies :

Twin City Clinical Association of Champaign and Urbana,
Neurological Society of Chicago,
Society of Internal Medicine of Chicago,
Physicians' Club of Chicago,
Society of Medical Examiners of Chicago,
Quincy Medical and Library Association,
Chicago Orthopedic Society,
East St. Louis City Medical Society,

Making sixteen new organizations for this year.

Few realize how satisfactory it is to a committee on Medical Societies to report sixteen new societies, for few know how much work it takes to organize one. The greatest trouble is to get answers to our letters. It is really strange how few answers we receive. Finally, we were compelled to get the help of representatives of drug houses, who visited the doctors, to report on each doctor in a county, using blanks furnished by this Committee. This report furnished us with the name of each doctor, the town he resides in, whether he would support a county organization, and if he belongs to any society, and also the most convenient place for him to meet at. This was the only way we could learn whether a doctor would support an organization or not. As the State now stands, there is no excuse for a doctor not belonging to a medical organization. A society in the extreme northwestern counties is badly needed, but as yet we have been able to make but little progress. We are still persevering, however, and hope by another year a society will be reported from there. The forming of new societies in White, Gallatin, Lawrence and Hardin counties this year improves the condition a great deal in the southern portion. If the societies now being agitated in Hamilton, Pope and Pulaski should mature, it is the opinion of this Committee that our profession will be organized as completely as it need be. From the extreme north to the extreme south plenty of societies exist. This Committee also feels that our work is not confined to the formation of new societies alone, but also to encourage and strengthen societies already existing, and we appeal to the Society to see that this support is given by maintaining to the letter the law that no one can belong to this Society without first uniting with the smaller organization at home. We would respectfully urge the subsequent Committee on Medical Societies to spend considerable time with existing societies, and try to reach the

profession at large through them rather than to form new societies. A report on the condition of each society next year would be very interesting.

Another matter that has given us much concern is, what to do with Irregulars. This may surprise some of you, but we find in some counties almost as many Irregulars as Regulars, and we are glad to note the best of feeling existing, so much so, the Regulars greatly desire the others to be made members. So far we have managed to have all societies subscribe to the Code, and none but Regulars are admitted. In some counties we found considerable sentiment toward admitting Eclectics. Finally, as a compromise, we concluded that we could in no wise allow Irregulars to be members, but any respectable physician not eligible to membership could, upon vote of the society, be made a social member, enjoying all the benefits of the society, except voting, holding office and being delegates. It might be well to have some expression from the Society on this question to guide further Committees. The Judicial Committee knows how thoroughly some localities are impregnated with the idea of disregarding schools of practice.

LIST OF COUNTY MEDICAL SOCIETIES.

Adams.
Bond.
Bureau.
Champaign.
Clinton.
Coles.
Crawford
DeWitt.
Fulton.
Gallatin.
Hancock.
Hardin.
Jackson.
Jersey.
Kankakee.
Lake.
Lawrence.
La Salle.
Macoupin.
McDonough.
Marion.
McLean.
Monroe.
Morgan.
Moulton.
Perry.
Saline.
Shelby.
St. Clair.
Stephenson.
Vermillion.
Wabash.
Whiteside.
White.
Warren.
Will.
Winnebago.

LIST OF CITY MEDICAL SOCIETIES.

Aurora Medical.
Decatur Medical.
Chicago Academy of Medicine.
Chicago Gynæcological Society.
Chicago Medical Society.
Chicago Medico-Legal Society.
Chicago Ophthalmological and Otological.
Chicago Pathological.
Galesburg Medical.
Ottawa Medical.
Peoria Medical.
Scandinavian Medical, Chicago.
Twin City Clinical Assoc. of Champaign and Urbana.
East St. Louis City Medical Society.
Neurological Society of Chicago.
Society of Internal Medicine.
Physicians' Club.
Society of Medical Examiners.
Quincy Med. and Library Assoc.
Chicago Orthopedic.

LIST OF DISTRICT MEDICAL SOCIETIES.

Æsculapian Society of the Wabash Valley.
Brainard District.
Capitol District.
District Med. Society of Central Illinois.
Egyptian Med. Society.
Fox River Valley.
Galva District.
Iowa and Illinois Central District Med. Assoc.
Medical and Surgical Society of Western Illinois.
Military Tract.

DISTRICT MEDICAL SOCIETIES—*Continued.*

North Central Illinois.
Pullman District.
Rock River Valley.
South Eastern Illinois.
Southern Illinois.

The thanks of this Committee are due to Dr. George P. Cassidy, of Gallatin county; Dr. J. F. Schrader, of Lawrence county; Dr. C. B. Horrell and Dr. R. E. Lewis, of McDonough county; Dr. Ellen H. Heise, of Fulton county; Dr. W. S. Holliday, of Warren county; Dr. W. A. Steele, of White county, and to our vigilant and accommodating Secretary, for very many favors received.

THE PRESIDENT: We will now listen to the report of the Committee on Medical Legislation, Dr. J. W. Pettit, of Ottawa, Chairman.

Dr. Pettit presented the following report:

The first duty which confronted your Committee on Medical Legislation, after their appointment, was the defeat of the bill exempting the osteopaths from the provisions of the Medical Practice Act. No attempt was made to defeat the passage of the bill, which was a foregone conclusion, but by a determined and united effort on the part of the profession, Governor Tanner was induced to veto it.

Our success in defeating this pernicious bill encouraged us to believe that the same unanimity of action would secure legislation which will not only tend to elevate the standard of the profession, but make it impossible for this class to prove even a formidable foe in the future.

We took up the work where our predecessors left it and proceeded upon the same line mapped out by them. In the prosecution of our work it has been necessary to attend a

large number of committee meetings. Our first meeting was with the State Board of Health and Legislative Committees of the Homeopathic and Eclectic Societies. It was unanimously agreed that we act jointly in an effort to secure a new medical practice act. An Executive Committee of eight (two from each committee) was appointed to formulate a bill and suggest a plan of action. This committee, after due deliberation extending over a period of several months, agreed upon a report which was submitted to the enlarged committee. To this meeting were invited about one hundred of the most prominent medical men of the State, many of whom responded to the invitation and participated in the discussion. The bill was discussed at length. Some minor changes were suggested and the whole matter referred back to the Executive Committee with power to act.

In pursuance of this order of the enlarged committee, the Executive Committee mailed a copy of the bill to about seven thousand regular physicians in the State, he protests against its becoming a law have been very few and for the most part from illiterates whose opposition is to be expected, and a few old physicians of the better class who cling to the theory of "once a physician, always a physician," and regard legislation of this kind as an unwarranted interference with their personal rights. A copy of this bill is submitted herewith as a part of our report:

A BILL.

For an Act to establish a State Board of Medical Examiners, prescribing its powers and duties, to provide for the licensing of practitioners of medicine and midwifery, and to regulate the practice of medicine and midwifery in the State of Illinois, and imposing penalties and to repeal all acts or parts of acts in conflict therewith.

SECTION 1. Be it enacted by the People of the State of Illinois represeted in the General Assembly: That a board of examiners to be known as the "State Board of Medical Examiners" shall be appointed as follows: Within sixty days after this act shall take

effect, the Governor shall appoint seven (7) physicians of recognized professional ability and standing, who have received the degree of Doctor of Medicine from some recognized college in good standing with the State Board of Health, as members of said Board, no one school of practice to have a majority, who shall hold their office until their successors are appointed and qualified. The members of said Board so first appointed, shall determine by lot, their respective terms of office, so that the term of one member shall expire on December 31st, 1899, and the term of one member on December 31st in each year thereafter. And at the expiration of the term of office of each of the members of the Board, the Governor shall appoint his or their successor or successors, whose term of office shall be for the period of seven (7) years ; and all vacancies occurring in the membership of the Board, by resignation or otherwise, shall be filled by the Governor, and all appointments on said Board shall be made from physicians having the qualifications prescribed herein for members of the first Board ; provided, however, that all appointments shall be made with the advice and consent of the Senate, but appointments made when the Senate is not in session may be confirmed at the next ensuing session thereof.

SEC. 2. The said Board shall, within thirty days after its appointment, meet and organize by electing a president, vice-president and treasurer from among its members, and a secretary who shall be a legally qualified physician not a member of the Board. Such officers shall hold office until the next annual meeting of the Board, or until their successors are elected and qualified. The Board shall prescribe the duties of its officers, and shall require the treasurer to give a satisfactory bond. The Board shall adopt and have a common seal, and the president or presiding member and the secretary shall be empowered to administer oaths in taking testimony, or in any matter pertaining to the duties of the Board. A majority of the Board shall constitute a quorum for the transaction of any business. It shall adopt such rules, regulations and by-laws not inconsistent with the laws of this State and of the United States, as it may deem necessary or proper to enable it to properly perform its duties and transact its business.

SEC. 3. The annual meeting of the Board for the election of officers shall be held in the State Capitol on the second Tuesday of January, in each year. The Board shall also hold regular meetings on the second Tuesdays in April, July and October in each year, at such places as it may determine, and may hold other meetings at such times and places as it may deem necessary, or its duties may require. It shall keep an official record of all its proceedings and a complete file of

all applications for licenses, together with the correspondence pertaining thereto, and of all examination papers, and shall make a report of its transactions, annually, to the Governor, which shall include a statement of all moneys received and disbursed by it, and an official list of all physicians and midwives authorized to practice in this State.

SEC. 4. No person shall hereafter begin the practice of medicine or any of the branches thereof, in this State, without first applying for and obtaining a license from said Board so to do. Appllications shall be in writing, and the form prescribed by the Board, and shall be accompanied by the examination fees hereinafter specified, and with proof that the applicant is of good moral character and has received a diploma conferring upon the applicant the degree of Doctor of Medicine from some legally incorporated medical institution in good standing, as may be determined by the Board, at the time of issuing said diploma. When the application and diploma aforesaid have been inspected by the Board, and found to comply with the foregoing provisions, the Board shall notify the applicant to appear before it for examination, at the time and place mentioned in such notice. Such examination shall be in the English language, and embrace those general subjects and topics, a knowledge of which is commonly and generally required of candidates for the degree of Doctor of Medicine by reputable medical colleges in the United States. No person shall hereafter begin the practice of midwifery in this State without first applying for and obtaining a license from said Board so to do. Applications shall be in writing, and in the form prescribed by the Board, and shall be accompanied by examination fee hereinafter specified and with proof that applicant is of good moral character, and has received a diploma from a school of midwifery, complying with the requirements of the Board. When the application and proofs aforesaid have been inspected by the Board and found to comply with the foregoing provisions, the Board shall notify the applicant to appear before it for examination, at the time and place mentioned in such notice. Such examination shall be in the English language, and of such character as to determine the qualifications of the applicant to practice midwifery. All examinations provided for in this act, shall be conducted under rules and regulations prescribed by the Board, which shall provide for a fair and wholly impartial method of examination. If the applicant successfully passes his or her examination, the Board shall issue to such applicant a license authorizing him or her to practice medicine or midwifery, as the case may be, in this State. Such license shall be in such form as may be determined by the Board, and in accordance with the provisions of this act: Provided, however,

any willful violation on the part of an applicant, of any of the rules and regulations of the Board governing examination, shall be sufficient cause for the Board to refuse to issue a license to such applicant.

SEC. 5. The examination fee for those desiring to begin the practice of medicine under the foregoing section shall be $20.00, and for those desiring to begin the practice of midwifery the examination fee shall be $15.00, and in all cases the examination fee must accompany the application.

SEC. 6. That all persons who, at the date of taking effect of this act, are qualified to practice medicine or midwifery, under the laws of this State, in force at the time of the passage of this act, and who desire to continue in practice, shall, within six months after the appointment and organization of the Board of Examiners, provided for in this act, apply to such Board for a license, which shall be issued by the Board on payment of a fee not to exceed fifty cents. Provided, the Board may refuse to issue such license to any such applicant for cause as hereinafter provided. All licenses issued under the provisions of this and the foregoing sections shall expire on a date to be named therein, not more than one year from the date of issue, so that all licenses outstanding at one time shall, as nearly as may be, expire on the same date.

SEC. 7. That all licenses issued under the provisions of this act, at the date of their expiration, be renewed for a period of one year, upon payment to the Board of a renewal fee not to exceed fifty cents, which renewal shall be evidenced by a new license. Provided, however, the Board may refuse such license for cause, as hereinafter provided.. The failure of a licentiate to obtain a renewal of license at the date of its expiration shall render such practitioner liable to the penalties provided for by this act for practicing without a license, but will not prevent application for a renewal license at some subsequent date, not later than one year from the date of expiration of his former license, within which time, subject to all the conditions for renewals heretofore provided for, the Board may issue a renewal license, which shall expire at the same date as if issued at the date of expiration of his former license. Provided, however, retirement from practice or removal from the State shall not deprive the licentiate of a right to a renewal within five years after such retirement or removal. All original licenses issued by the Board shall be signed by all the members of the Board. All renewals shall be signed by the President and Secretary of the Board and attested by the seal of the Board.

SEC. 8. The Board may refuse to issue any license provided for by this act, whether an original or renewal license, if it shall appear that the person applying therefor has been guilty of persistent inebriety, or

the practice of criminal abortion, has been convicted of a crime involving moral turpitude, or has, by false or fraudulent representations, obtained practice in his or her profession or by the false or fraudulent practice of his or her profession has obtained money or any other thing of value. Provided, however, no person shall be finally refused a license until after the applicant for the same has been given at least thirty days' notice of the grounds for such refusal, and opportunity given the accused for a hearing before the Board to show cause why the Board shall not finally refuse his or her license, at which hearing the accused shall be entitled to be represented by counsel.

SEC. 9. That any person shall be regarded as practicing medicine within the meaning of this act who shall operate for or upon, prescribe for, or otherwise treat, or profess to heal or cure any physical or mental ailment, or any physical injury to or deformity of another: Provided, nothing in this act shall be construed to apply to the practice of dentistry or pharmacy, to the administration of domestic or family remedies in cases of emergency, to commissioned surgeons of the United States Army or Navy, or Marine Hospital Service, in the discharge of their official duties.

SEC. 10. That any itinerant vender of any drug, nostrum, ointment or appliance of any kind intended for the treatment of disease or injury who shall vend or sell any such drug, nostrum or appliance, or who shall, by writing or printing, or any other method, profess to the public to cure or to treat disease or deformity by any drug, nostrum or appliance, shall pay a license of one hundred (100) dollars per month into the treasury of the Board, to be collected by the Board in the name of the People of the State of Illinois, for the use of said Board. And it shall be lawful for the State Board of Medical Examiners to issue such license on application made to said Board, said license to be signed by the President of the Board and attested by the Secretary with the seal of the Board, but said Board may, for sufficient cause, refuse said license. Any such itinerant vender who shall vend or sell any such drug, nostrum, ointment or appliance, or who shall, by writing or printing, or any other method, profess to cure or treat diseases or deformity by any drug, nostrum or appliance, without a license so to do, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished for the first offense by a fine of not less than one hundred dollars, or by imprisonment in the county jail for a period of not less than thirty nor more than ninety days, or by both fine and imprisonment, and for each subsequent offense the penalty shall be double that of the preceding one.

SEC. 11. That the office expenses of the Board, and all expenses arising from the proper enforcement of the provisions of this act, shall be paid from the fees above provided for, and from such fines as may accrue to the Board for the violation of the provisions of this act.

SEC. 12. That the salary of the Secretary of the Board shall be fixed by the members of the Board, and shall not exceed the sum of $3,000 per annum. The members of the Board shall receive no compensation, but their traveling and other expenses incurred while employed on the business of the Board shall be paid.

SEC. 13. That any person hereafter practicing or attempting to practice medicine or midwifery in this State without having a licence so to do, as herein provided for, or contrary to the provisions of this act, shall be deemed guilty of a misdemeanor and upon conviction thereof, shall be punished for the first offense by a fine of not less than one hundred dollars and not exceeding two hundred dollars, or by imprisonment in the county jail for a period of not less than thirty days nor more than ninety days, or by both fine and imprisonment, and for each subsequent offense, the penalty shall be double that of the preceding one: Provided, that the provisions of this section shall not apply for a period of six months after the appointment and organization of the first Board, to those persons who are qualified to practice medicine and surgery or midwifery, under the laws of this State in force at the time of the passage of this act.

SEC. 14. That all suits for the recovery of the several penalties prescribed in this act shall be prosecuted in the name of the "People of the State of Illinois," in any court having jurisdiction, and it shall be the duty of the State's Attorney of the county where such offense is committed to prosecute all persons violating the provisions of this act, upon proper complaint being made. All penalties shall be paid into the treasury of the State Board of Medical Examiners.

SEC. 15. All acts or parts of acts inconsistent or in conflict with the provisions of this act are hereby repealed.

While we have found the profession almost unanimous in favor of restrictive legislation as a general proposition, a failure to comprehend or recognize the legal principles which must be observed in framing a measure of this kind has led to some confusion of details as to methods, and herein lies the difficulty of harmonizing the profession upon some specific measure. Unless it can be clearly shown that such a law is in the interest of the public, it will not stand the test of a

judicial decision, as the Constitution expressly prohibits class legislation. Such regulations are under the police power of the State and must be for the protection of the public and not the profession. Whatever advantages may accrue to the profession by such a law must be incidental to the public good. We demean ourselves and belittle our profession when we attempt to secure the enactment of a law for our own protection. This principle of protection to the public must constantly be kept in view and any departure from it will nullify any law we may succeed in having enacted.

Medical license laws are only defensible on the theory that they are needed to protect the public health. Any attempt to favor physicians, as a class, or one class of physicians at the expense of others, has been declared illegal, hence the difficulty in determining who should be excluded from the privileges of practice. Much as we are in the habit of finding fault with the decisions of our courts, where this issue is involved, a careful investigation shows that, as a rule, courts have been liberal in their construction of the law and have favored progressive medicine in so far as these laws have been consistent. We have endeavored to avoid the risk of an adverse decision if the proposed bill becomes a law. This will explain the omission of some provisions which would ordinarily be expected in such a bill, and the presence of others which may seem unnecessary, or even obnoxious.

We recommend that a copy of the bill, finally agreed upon, be submitted to each candidate for the legislature by the physicians in his district, and unless he promises his unqualified support we defeat his election if possible. In order to carry out this work thoroughly and provide for all ordinary contingencies the Committee believe that not less than twenty-five hundred dollars will be required. Of this, the regular physicians will be expected to raise twelve hundred dollars,

which will be about fifty cents per capita for the members of the various medical organizations of the State. If these fail to respond, the deficiency to be raised by private subscriptions in the cities and larger towns.

We believe that by a properly directed and vigorous effort any reasonable bill endorsed by the profession can be made a law. Respectfully submitted,

J. W. Pettit, Chairman.
D. R. Brower.
D. W. Graham.
Jno. B. Hamilton.
H. N. Moyer.
J. B. Maxwell.

At the conclusion of the reading of the report, the President said: Perhaps it would be well to postpone discussion on this report until the members of the Society have had time to look over the bill, so as to be able to discuss it intelligently.

Dr. E. P. Cook: It seems to me that this report should not pass without receiving some attention. This is a subject which has been receiving the attention of the Society for a number of years, and at this stage of our proceedings I think we should have some expression of opinion from the members. We cannot afford to let such a report go by without giving it the attention it deserves. We rejoiced very much a year ago over the defeat by virtue of the veto of the Governor of the osteopath bill. It is a question in the minds of some whether it is not possible to arouse agitation that is helpful; I happen to be one of those who believe that this subject is worthy of the most serious consideration of the profession. We are acting unselfishly in the interests of the public. I have nothing special to say this morning other than to indicate my interest in, and my personal appreciation of, the good work

done by the Committee, and particularly Dr. Pettit, the chairman. I have no definite thoughts in my mind just now, but I trust we will take an active interest in this work, and hope that we may arrive at results which will ultimately be very satisfactory to the public as well as the profession.

Dr. Daniel R. Brower: I move that the discussion on this matter of legislation be deferred until after the papers prepared for Section Three are read. Carried.

On motion of Dr. C. W. Hall, the report of the Committee on Medical Legislation was adopted.

The President: We will now listen to the report of the Committee on Necrology and Biography by Dr. J. H. Hollister, of Chicago, chairman. The report was read as follows:

REPORT OF THE COMMITTEE ON NECROLOGY AND BIOGRAPHY.

Gentlemen of the Illinois State Medical Society: Your committee desire herewith to submit the following brief report of those members of the Society who have died during the current year ending May 1, 1898:

JAMES S. WHITMIRE.

James S. Whitmire, of Metamora, Ill., died on July 15th, 1897. He graduated in medicine from the Medical Department of Illinois College in 1847. Later he received the *first ad eundem* degree conferred by Rush Medical College, and in 1856 he received the degree of M. D. from Jefferson Medical College. In the Civil War he was the surgeon of the Fifty-Sixth Illinois Volunteer Infantry, and rendered important service on various battle fields including Corinth and Iuka. He was one of the organizers of our State Medical Society in 1850, also of the Woodford County Medical Society, a member of the North Central Illinois Medical Association. and a member of the American Medical Association. Perhaps no

member of our State Society was more uniform in attendance upon the annual meetings for nearly fifty years than was Dr. James S. Whitmire.

WILLIAM C. WEST.

William C. West, a member of the Society, died at his home in Geneseo, Ill., on July 10th, 1897, of suppurative pancreatitis. He was a native of Maryland and was born February 27, 1835. He was a graduate of the College of Physicians and Surgeons, of Keokuk, Iowa, in 1863, and had been in active practice for thirty-four years. Aside from his ordinary professional labors he was an expert microscopist and was one of the leading members of the American Microscopical Association. His burial was in Monroe, Michigan.

WILLIAM E. CLARK.

William E. Clark, died at his country residence at River Forest, a suburb of Chicago in March, 1898. He was a graduate of the Rochester Collegiate Institute in 1842, and of the Vermont Medical College in 1845. He had been in continuous medical practice in Chicago since 1862, and was prominently related with the profession and was held in highest esteem. He was both the champion and an authority in matters pertaining to medical ethics. He was a member of the Chicago Gynecological Society, Chicago Pathological Society, Chicago Medical Society, the Illinois State Medical Society and the American Medical Association. As a successful physician, and as an active Christian citizen he was greatly respected by all who knew him.

ERASMUS GARROTT.

Erasmus Garrott, chief medical inspector of the Chicago Health Department, and an acknowledged authority on eruptive and skin diseases, died in March last at his resi-

dence, 751 Washington Boulevard, Chicago, after an illness of four months, as a result of a bruise upon the leg, which refused to heal and which finally developed systemic infection.

Dr. Garrott had been connected with the Health Department since 1876. His special work was that of superintending vaccination and the cure of small-pox patients. During the small-pox epidemics of 1881-1882 and 1894 his services were of inestimable value to the city. He was a recognized expert on small-pox and was frequently called out of the city to consult in cases where this disease was suspected.

Dr. Garrott was born in Maryland in 1836; graduated from the University of Maryland in 1856, and soon after settled in Denver, Colo. At the outbreak of the Civil War he joined a regiment of Colorado rangers as surgeon. He became a resident of Chicago in 1873. He was a member of the Masonic fraternity, and prominently identified with the Grand Army of the Republic. He was an active member of the Chicago Medical Society, and also of the State Society. He leaves a widow, one daughter and one son as his survivors.

Appropriate resolutions in memory of the deceased and of his valuable services were duly engrossed in the records of the Health Department of Chicago.

MARINUS W. SEAMAN.

Marinus W. Seaman, a resident of Shipman, Macoupin County, Ill., and a member of this Society, died September 18th, 1897. He was born in Glenn Falls, New York, January 11, 1830. He graduated in medicine at the Albany School, having maintained himself by his own labor, while at the same time he was pursuing his professional studies. He was of New England antecedents, and yet was destined to powerfully impress his strong convictions upon the young and growing West. He went first to St. Louis, then to Leaven-

worth, but did not locate in practice until he came to Shipman in 1854. He was one of the charter members in the organization of the Macoupin County Medical Society in 1873. For three years he served with distinction in the Civil War as surgeon of the 122d regiment of Illinois volunteers, resuming his general practice when the war was closed.

He became a member of this Society, and also of the American Medical Association in 1884. That the Macoupin County Medical Society has not failed to hold its regular meetings in a single instance in twenty-four years was largely due to him.

JAMES F. ALLEN.

James F. Allen, of Warrensburg, Macon County, Illinois, a member of this Society, is reported to have died during the year, but the Committee has not received the necessary data from which to submit a full report. They desire to confer by letter or otherwise with those by whom he was best known, and who can furnish the needed data. This much we learn: He was a graduate of the Jefferson Medical College in 1887 and died at the age of 32 years of tuberculosis, leaving a wife and two children.

JOHN H. HOLLISTER,
O. B. WILL,
E. J. BROWN,
} Committee.

On motion, the report was referred to the Committee on Publication.

Dr. Pitner, of the Auditing Committee, reported that he had examined the books of the Treasurer and had found them correct and neatly kept.

SECTION THREE—FIRST SESSION.

This Section was called to order by the Chairman, Dr. Daniel R. Brower; Secretary, Dr. C. B. Johnson, of Champaign.

The Chairman, in opening the Section, made the following remarks :

PRELIMINARY REMARKS OF THE CHAIRMAN OF SECTION THREE—ETIOLOGY, STATE MEDICINE AND MEDICAL JURISPRUDENCE.

There has been prepared for you a program containing three important topics on which we need more legislation. Legislation not to benefit the medical profession, as some of the laity suppose, but, on the contrary, legislation for the benefit of the public.

1. *Medical Practice.* Every physician in the State knows that the State Board of Health has been powerless in its efforts against quackery. When the present State law went into operation there were only five medical colleges in the State, now there are twenty-five, and they may be classed as we did the verbs, when I was a boy, as regular, irregular and defective. This great increase in the number of medical schools is a consequence of the fact that the only qualification necessary to practice medicine in the State of Illinois is a diploma from a recognized college. To supply the demand for these diplomas many factories were established. To correct this great evil and to protect the people against poor doctors, more legislation seems to be necessary.

2. *Medical Expert Testimony.* The present status of medical expert testimony is a great discredit to this learned profession. The courts in many states have declared it to be of no value, whereas, we know that testimony that is expert is of incalculable value in a court of justice. We certainly need legislation to regulate this matter and to give this testimony the position of importance and responsibility it is entitled to. So long as physicians are arrayed against each other as partisans, just so long will their testimony be discredited.

3. *State Sanitation.* We need added legislation for State sanitation. The medical profession deserves special credit for its self-sacrificing determination to prevent disease. The laity do not seem to appreciate the efforts we are constantly making in their behalf in this direction. The legal profession by multiplying laws and complicating judicial proceedings are constantly making it more and more difficult for the laity to make a step without legal advice. The medical profession, on the contrary, by publishing broadcast the laws of health and the methods of sanitation are helping the people daily to make the services of the physician less necessary.

These several topics will be presented to you in detail by the able essayists who have been selected and I hope the result of this section's work will be an education to the profession at large and be of lasting benefit to the community generally.

Dr. George N. Kreider, of Springfield, read a paper entitled "Defects of the Laws of this State Governing Medical Practice."

Dr. Harold N. Moyer, of Chicago, contributed a paper entitled "What Should be the Law in this State."

Dr. L. R. Ryan, of Galesburg, read a paper entitled "The Advantages of Separating the State Board of Health from the Licensing Board."

Dr. H. M. Bascom, chairman of the Committee on Legislation for the Illinois Homeopathic Medical Society, was extended the privileges of the floor and made a few appropriate remarks along the line of medical legislation.

These several papers were then discussed jointly by Drs. Carter, Dickinson, Corr, Hollister, Sutton, Patrick and Pettit.

On motion of Dr. Corr, the Society unqualifiedly endorsed the present bill which the committee intends to present to the Legislature at its next session.

The next thing in order was a symposium on expert testimony, and papers were read as follows:

1. "Summary of Laws Governing Expert Testimony in Other States and Countries," by Dr. J. O. DeCourcy, of St. Libory.

2. "Defects of Laws Governing Expert Testimony in this State," by Drs. Sanger Brown, of Chicago, and Frank P. Norbury, of Jacksonville.

3. "Personal Experience with the Effects of the Dixon Decision," by Dr. Denslow Lewis, of Chicago.

4. "The Outlines of a Law that Would Remedy the Defect," by Dr. D. W. Graham, of Chicago.

Dr. J. A. Egan, of Springfield, then presented a paper on "The Legislation Necessary to Promote Better Sanitation Throughout the State."

On motion, the Society adjourned until 2 P. M.

SECOND DAY—AFTERNOON SESSION.

The Society reassembled at 2 P. M. and was called to order by the President.

Dr. D. W. Graham offered the following amendment to Section 1, Article III of the By-Laws:

Move to amend Article III, Section 1, of the By-Laws, by inserting the following after the word "committee," fourth line from the bottom of page 12, Constitution and By-Laws, "and shall assemble and organize at the hour of 12 o'clock." Carried.

The Secretary read a telegram from the Secretary of the Pennsylvania State Medical Society extending greetings.

On motion of Dr. Hall the Secretary was instructed to reciprocate these greetings.

Dr. Hall: I understand that the Iowa State Medical Society is in session at the present time, and I move that we send our greetings to them also. Carried.

There being no further business to come before the general session, Section Two was called to order by the Chairman, Dr. J. L. Wiggins, of East St. Louis; Dr. A. E. Halstead, of Chicago, Secretary.

SECTION TWO—FIRST SESSION.

Dr. Henry F. Lewis, of Chicago, read a paper entitled "Uremia in Child-Bearing," which was discussed by Drs. Ries, Catto, and in closing by the essayist.

Dr. Henry T. Byford, of Chicago, read a paper entitled "An Improvement in the Technique and the After-Treatment of Peritoneal Section," which was discussed by Dr. Lanphear, of St. Louis, by invitation.

Dr. Franklin H. Martin, of Chicago, read a paper entitled "Early Operation for Uterine Cancer," which was discussed by Dr. Ries.

Dr. Robert H. Babcock, of Chicago, followed with a paper on "The Diagnosis of Acute Pulmonary Abscess and Gangrene, with Especial Reference to their Surgical Treatment."

The paper was discussed by Dr. McArthur, and in closing by Dr. Babcock.

Dr. Henry P. Newman, of Chicago, read a paper on "Conservation of Tissue and Function in Surgery of the Uterus and its Adnexa," which was discussed by Dr. Byford, and in closing by the essayist.

Dr. L. L. McArthur, of Chicago, read a paper on "Sacro-Iliac Tuberculosis," which was discussed by Drs. Van Hook, Graham, Johnson, and in closing by the essayist.

Dr. Weller Van Hook, of Chicago, read a paper entitled "Operations Upon the Anal Tube; A New Device." Discussed by Dr. Bacon.

Dr. M. L. Harris, of Chicago, read a paper entitled "A New and Simple Method of Obtaining Urine Separately from the Two Kidneys in Either Sex."

This paper was discussed by Drs. Frank, McArthur, Newman and Halstead.

The committee appointed to attend the funeral services at the house of Dr. Aldrich reported that the doctor and his family were very much affected, and wished to express their gratitude to the Society.

In the evening the annual dinner of the Society was held at the parlors of the First Presbyterian Church.

Dr. Harold N. Moyer, of Chicago, acted as toastmaster.

The following toasts were responded to :

"Bonds of Sympathy," Dr. J. L. Wiggins, East St. Louis, Illinois.

"We pine for kindred natures to mingle with our own,
For communings more full and high than aught by mortals known."—*Mrs. Hemans.*

"Unity of Education," Rev. C. E. Nash, Galesburg, Ill.

"A little learning is a dangerous thing,
Drink deep or taste not the Pierian Spring."—*Pope.*

"The Domsie and the Doctor," Pres. John H. Finley, Galesburg, Ill.

"In faith and hope the world will disagree,
But all mankind's concern is charity."—*Pope.*

"The Laity," - - - - Dr. E. W. Weis, Ottawa, Ill.

"Most of those evils we poor mortals know,
From doctors and imagination flow."—*Churchill.*

"Doctors in Law," George A. Lawrence, Esq., Galesburg, Illinois.

"Even doctors, for woe or weal,
Rest hope and life on lawyer's zeal."—*Rex.*

"The Latest Pathy," - Dr. A. C. Corr, Carlinville, Ill.

"Fashion, a word which knaves and fools may use,
Their knavery and folly to excuse."—*Churchill.*

"Do we Rise or Fall," - Dr. J. B. Bacon, Chicago, Ill.

"There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune."—*Shakespeare.*

"Looking Backward," - Dr. E. P. Cook, Mendota, Ill.

"Backward, turn backward, Oh, time in your flight,
Make me a child again just for to-night."—*Elizabeth Akers.*

THIRD DAY—MORNING SESSION.

The Society met at 9 A. M. and was called to order by the President.

The Secretary read the following report of the Nominating Committee :

REPORT OF NOMINATING COMMITTEE.

President—Dr. T. J. Pitner, Jacksonville.

First Vice-President—Dr. H. N. Moyer, Chicago.

Second Vice-President—Dr. J. T. McAnally, Carbondale.

Permanent Secretary—Dr. Edmund W. Weis, Ottawa.

Assistant Secretary—Dr. W. F. Grinstead, Cairo.

Treasurer—Dr. George N. Kreider, Springfield.

Judicial Council { Dr. J. F. Percy, Galesburg.
Dr. James L. Reat, Tuscola.
Dr. C. E. Black, Jacksonville. }

SECTION ONE.

Chairman—Dr. A. C. Cotton, Chicago,

Secretary—Dr. H. W. Woodruff, Joliet.

SECTION TWO.

Chairman—Dr. Weller Van Hook, Chicago.

Secretary—Dr. E. M. Sutton, Peoria.

SECTION THREE.

Chairman—Dr. C. B. Johnson, Champaign.

Secretary—Dr. H. C. Fairbrother, East St. Louis.

Place of Meeting—The society was invited to three cities to meet with them, viz.: Joliet, Cairo and Champaign. The Mayor of Joliet, Mr. S. Lagger, was present in behalf of that city. Mr. N. B. Thistlewood, the Mayor, and a committee of citizens, presented the claims of Cairo. The committee selected Cairo as the next place of meeting. Mr. J. S. Aisthorpe, representing the Cairo Board of Trade, thanked the committee for the selection of Cairo and promised the Society a royal reception.

COMMITTEE OF ARRANGEMENTS.

Chairman—Dr. J. C. Sullivan, Drs. W. F. Grinstead, S. B Cary, J. J. Rendleman, John T. Walsh, Cairo.

COMMITTEE ON NECROLOGY AND BIOGRAPHY.

Dr. John H. Hollister, Chicago.

Dr. O. B. Will, Peoria.

Dr. E. J. Brown, Decatur.

COMMITTEE ON MEDICAL LEGISLATION.

Chairman—Dr. J. W. Pettit, Ottawa.

Dr. H. N. Moyer, Chicago, and Dr. George N. Kreider, Springfield.

COMMITTEE ON MEDICAL SOCIETIES.

Dr. C. W. Hall, Kewanee, Dr. J. A. Baughman, Neoga, and Dr. J. O. DeCourcy, East St. Louis.

THE PRESIDENT: You have heard the report of the Committee on Nominations. What will you do with it?

DR. A. C. CORR: I move that the report be adopted, and that the officers selected be elected. Carried.

DR. W. O. ENSIGN: I move that the Secretary be instructed to bring the By-Laws and Constitution up to date, and that they be published in the next volume of Transactions. Seconded.

DR. J. O. DECOURCY: Would it not be well to authorize the Secretary to print the Code of Ethics of the American Medical Association in the Transactions as well? If published in a volume it could be permanently kept.

THE PRESIDENT: I do not think it is necessary or proper for us to publish the Code of Ethics in our Transactions, when a copy of the Code can be procured for a few cents by writing the Journal of the American Medical Association.

DR. DECOURCY: I would like to say, Mr. President, that I have had some experience in trying to secure copies of the

Code of Ethics by writing the Journal of the American Medical Association, and I have been unable to procure them.

The motion of Dr. Ensign was then put and carried.

(No action was taken with regard to the suggestion of Dr. DeCourcy.)

Dr. C. W. Hall asked for an expression from the Society as to whether it would be agreeable for the Committee on Medical Societies to allow Eclectics or Homeopaths to be made social members of new societies.

This subject was then discussed by Drs. Pettit, Cook and Corr, after which the President decided that the matter should be referred to the Judicial Council.

On motion of Dr. W. O. Ensign, Dr. L. G. Thompson, of Lacon, was placed on the Committee on Society History.

Dr. J. W. Pettit: We want twelve hundred dollars from the regular profession of the State, and at least three hundred of it ought to come from this Society, and in proportion to the number of societies we have it would be about fifty cents per capita. I therefore move that the Society appropriate such an amount for the Committee on Medical Legislation as it sees fit. Seconded.

Dr. Cook: Why not amend the motion, so as to say three hundred dollars, or so much thereof as in the judgment of the President, Secretary and Treasurer may be necessary out of this twelve hundred dollars?

Dr. Pettit: I will accept the amendment.

The motion as amended was carried.

The Secretary announced the following as delegates to the meeting of the American Medical Association:

E. P. Cook, Mendota.
T. J. Pitner, Jacksonville.
Geo. W. Cox, Chicago.
P. H. Oyler, Mt. Pulaski.
J. E. Coleman, Canton.
J. F. Percy, Galesburg.
J. W. Pettit, Ottawa.
E. J. Brown, Decatur.

A. M. Earle, Abington.
H. P. Newman, Chicago.
Z. H. McClanahan, Oneida.
George W. Johnson, Chicago.
L. A. Westgate, Sycamore.
C. F. Wilhelmj, E. St. Louis.
D. R. Brower, Chicago.
J. O. DeCourcy, E. St. Louis.
J. M. G. Carter, Waukegan.
F. P. Norbury, Jacksonville.
J. W. Hairgrove, Jacksonville.

Section Two was then called to order by the Chairman, Dr. Wiggins.

Dr. A. E. Halstead, of Chicago, read a paper entitled "Surgical Treatment of Acute Abscess and Gangrene of the Lung," which was discussed by Drs. Frank, Catto, and in closing by Dr. Halstead.

Dr. William Catto, of Decatur, read a paper on "Urinary Fistula."

Dr. A. C. Corr, of Carlinville, followed with a contribution entitled "Points in Minor Surgery," which was discussed by Drs. Standley, Ochsner, Cole, Bolles, Horrell, Frank, Cook, and in closing by the essayist.

Dr. J. O. DeCourcy, of St. Libory, read a paper entitled "Straits in Early Life," which was discussed by Drs. Cole and Fairbrother.

Dr. A. I. Bouffleur, of Chicago, read a paper entitled "An Interesting Case of Pyonephrosis," which was discussd by Drs. Robinson, Sutton, Ryan, and in closing by the essayist.

Dr. Jacob Frank, of Chicago, read a paper entitled "The Pathological Histology of Intestinal Union After the Use of the Frank Bone Coupler," which was discussed by Drs. Bouffleur, Bacon, Patten, and the discussion closed by Dr. Frank.

At this juncture the President called the Society in General Session.

Dr. E. P. Cook offered the following resolutions, which were unanimously adopted by a rising vote :

Conforming to our time-honored custom, we, the Members of the Illinois State Medical Society, at the close of this, our Forty-Eighth Annual Meeting, hereby give expression to our appreciation for the kind and courteous manner in which we have been received and entertained in the beautiful city of Galesburg, the Athens of Northern Illinois. Therefore be it

Resolved, That we extend our thanks to the medical profession and citizens; to the Committee of Arrangements, and especially the Chairman, Dr. Aldrich, and Dr. Percy, who assumed the duties of that position for Dr. Aldrich, and to Dr. Cowan, the Assistant Secretary; to the city government for their royal reception as presented by his Honor, Mayor Cooke; the President, John H. Finley, of Knox College, who, in the absence of Drs. Etheridge and Senn, consented to address the Society and citizens at the Auditorium; to the President and Faculty of Knox College, who so kindly remembered the spiritual wants of the members of the Society by an invitation to the college chapel for morning prayer, and in many other ways have contributed to make our visit delightful.

We must further not be forgetful of the great advantage enjoyed by the Society in our good fortune in having provided as our place of meeting, by courtesy of the Board of Supervisors of Knox County, the beautiful and commodious Court House, so well adapted in every way to our use.

We further recognize the generous contributions to the interest of our annual gathering made in either unselfish or commercial spirit by the representatives of numerous pharmaceutical firms, publishers and instrument makers.

Finally, it is with saddened hearts and deepest sympathy that we again extend to Dr. Aldrich, Chairman of the Committee of Arrangements, and his family, our condolence in this hour of their great affliction.

Dr. Carter, the retiring President, said: It is necessary for me to turn over the remaining work of the General Sessions to the President-Elect at this time. I wish before leaving to thank the members of the Society who have so readily assisted us in making this meeting a grand success. I also wish to thank the efficient officers of the Sections and the Committee of Arrangements for the work they have done in furthering our success. I congratulate the Society on having elevated the eminent and scholarly gentleman, who has

served as your First Vice-President, to the presidency, and I will ask Drs. Bacon and Best to conduct the President-Elect to the Chair.

The President-Elect, Dr. Pitner, was then presented by Dr. Carter.

Dr. Pitner was warmly received. He said :

Mr. President, and Members of Illinois State Medical Society:

I cannot find suitable words to express my appreciation and gratitude for this expression of your confidence in placing me in this position of honor. It will be the more easy for me to discharge the duties of this office, which I keenly feel, after having profited by the example of my efficient predecessor in office. I think the Society is to be congratulated upon a very successful meeting. The President and all of the officers of the Sections have done excellent work, as has been shown by this meeting. The Society is progressing more rapidly than it has done heretofore, and may I bespeak your active co-operation in the coming year to promote the interests of the Society. Again I thank you for the honor you have conferred upon me. (Applause.)

The Secretary read a telegram from the Iowa State Medical Society, in session at Des Moines, reciprocating greetings.

He also read a telegram from Dr. Nicholas Senn to the effect that official duties prevented him from being present, but he hoped the Society would have a pleasant and profitable meeting.

On motion, the Society adjourned until 2 P. M.

THIRD DAY—AFTERNOON SESSION.

The Society reassembled at 2 P. M., and was called to order by the President.

There being no business to come before the General Meeting at this time, Section Two resumed its work.

Dr. H. C. Fairbrother, of E. St. Louis, read a paper on "Repair of Bones," which was discussed by Drs. Harsha, Corr, Bouffleur, Horrel, DeCourcy, and in closing by the essayist.

Dr. Emma B. Standley, of Alexis, presented a contribution entitled "My Name is Appendicitis."

Dr. Joseph B. Bacon, of Chicago, read a paper entitled "A Plea for Early Operation in Lacerations of the Cervix Uteri."

This paper was discussed by Drs. Lanphear, Ries, and in closing by Dr. Bacon.

Dr. Emil Ries, of Chicago, read a paper entitled "Plastic Operations on the Tubes."

This paper was discussed by Drs. Bacon, Lanphear, and in closing by the essayist.

Dr. Edward H. Ochsner, of Chicago, contributed a paper on "The Treatment of Septic Infections Following Pin Pricks, Abrasions and Similar Injuries."

Dr. E. H. Root, of Chicago, read a paper entitled "Hydramnios and Its Effect on Gestation."

There being no other papers to be read before the Section, the Society was called in General Session.

The Secretary read a telegram from Dr. Norval H. Pierce, expressing his regret at not being able to attend the meeting, and asked that his paper be read by title.

A telegram was also read from Dr. John B. Hamilton, of Chicago, stating that Dr. Senn's address had been mailed.

On motion of Dr. Corr, these papers were referred to the Publication Committee.

Dr. Corr: I move that Dr. J. W. Pettit be authorized by this Society to arrange for an excursion to the International Medical Congress to be held in Paris, in 1900, to be known as the Illinois State Medical Society European Excursion. Seconded and carried.

Dr. Corr: There is one other matter to be disposed of before we adjourn, and that is with reference to the two thousand dollars to be contributed towards the Rush Monument Fund. It will be remembered that this subject was brought up at a previous general session, but as it was early in the session the President thought it would be better to defer it until a larger number of members was present, and then have some action taken. The matter stands like this: At the Philadelphia meeting of the American Medical Association last year I was Chairman of the Illinois Delegation, as Dr. Carter could not go, and as such I was called upon by the other members to pledge so much for the State of Illinois in order to make up the amount necessary. I said at that time that Illinois would contribute her share, and that I was authorized as Chairman of the Delegation to say that Illinois would pledge two thousand dollars. I might say in this connection that Ohio and other states pledged two thousand dollars each.

Dr. Wiggins: How is this money to be raised?

Dr Corr: I should think by pro rata subscriptions.

Dr. DeCourcy: I think that what Dr. Corr wants is for this Society to ratify the pledge made by the delegates of the Illinois State Medical Society at the Philadelphia meeting last year, and that afterwards efforts be made to raise the necessary amount.

The President: You may approve the proposition and recommend that efforts be made to raise the money.

Dr. DeCourcy: I now move that the Society ratify the action of the delegates of the Illinois State Medical Society taken at the Philadelphia meeting last year, in regard to raising money for the Rush Monument—two thousand dollars having been pledged by our State. Carried.

Dr. DeCourcy: I now wish to make a motion that the

Chair be authorized to appoint a committee of five whose business it shall be to raise funds for the Rush Monument between now and our next meeting by subscriptions.

DR. WIGGINS: I do not know exactly how many years this proposition has been before the profession, but I think possibly ever since Dr. Rush died. Personally, I would like to see this two thousand dollars raised within a specified time, say within a month or two.

THE SECRETARY: The profession will be called upon this year to contribute for various purposes, particularly to the Legislative Committee, and if the members are called upon to subscribe to so many things, they will not respond as freely as we would like to have them. It seems to me a committee should undertake this work and do the best they can

Dr. DeCourcy's motion was then put and carried.

The President named the following as such committee:

A. C. CORR, E. F. INGALS,
E. P. COOK, J. O. DECOURCY,
S. C. PLUMMER.

Dr. Emory Lanphear, of St. Louis, extended an invitation to the Society to attend the meeting of the Missouri State Medical Association to be held in Kansas City.

There being no further business to come before the General Session, the Society, on motion, adjourned to meet in Cairo the third Tuesday in May, 1899.

EDMUND W. WEIS,
Permanent Secretary.

THE PRESIDENT'S ADDRESS.

"Advances in the Domain of Preventive Medicine."

BY J. M. G. CARTER, M. A., M. D., SC. D., PH. D., WAUKEGAN.

Mr. Chairman, Ladies and Gentlemen:

Standing at the close of the nineteenth century it seems very appropriate that we should reflect upon the victories which have been won in the field of medicine, the foundations which have been laid for higher, better and nobler work in the future, and the character of that future work which lies especially in the domain of preventive medicine.

The smallpox scourge of the last century yielded a death harvest of 500,000 people annually. In many cities almost every individual had the disease. It is as rare *now* to meet a person who has *had* variola, as it was then to see one who had *not* been affected by that disease. The advances in preventive medicine which reduced the dreadful mortality of that affection are truly wonderful.

However, the growth of medicine during these years cannot be limited by the banishment of smallpox. Other diseases have yielded to its advance. Cholera and yellow fever are not dreaded now with the terror that formerly filled the hearts of the people in every community when the approach of these maladies was announced. Even the more common ailments, diphtheria, scarlet fever, measles, typhoid and other infectious diseases have lost so much of their virulence, that less fear of their ravages is now entertained. The masterly scientific

work of Jenner, Koch, Pasteur and othersenables us to-day to contend successfully with most of the infectious diseases. Only a few years ago many a physician lost his life in the struggle with these diseases which now by means of vaccination, inoculation and the antitoxins are often easily vanquished.

It was not an uncommon occurrence half a century and a century ago for the annual death rate in cities to reach 40 and 50 per thousand. *Now* none but the most filthy have so high a death rate and some of the large cities of the world have reduced the death rate to less than 15 per thousand. What is it that makes this difference between the cities of the old world then, and Chicago and other wide awake cities of the new world, to-day?

If I were to answer in one word, I should say, *cleanliness.* The reeking filth of the past was the great harbinger of disease, the death angel ever ready to decimate the world with his ghastly work of destruction.

The struggle for cleanliness in surgery, in medicine, in public buildings, in armies, in hospitals, and in the homes of the people, has been the battle heroically waged by the profession during the last half of this wonderful nineteenth century.

The victories won have been famous and life saving. Aseptic surgery is a reality. Antiseptic medicine is in general favor. The armies of the world are scientifically superintended so that military hygiene is in high repute and the record of military hygiene and surgery in the Spanish-American war will add to the glory of the United States. Public buildings are better cared for, and our hospitals are models of cleanliness and beauty.

Much has been taught and something done to render the homes of the people less open to the ravages of the infectious diseases. How shall contagion be kept from the homes of the masses? Here is the great problem of the future, and the

medical profession must help to solve it. Neither the aristocracy of wealth nor that of education alone will solve it. Republicanism, democracy and socialism alone will be equally impotent to bring about this desirable end. It will require the united efforts of the patronizing instincts of wealth, the broadening and elevating mental characteristics of education, the political equality inculcated by republicanism and democracy, the economic equality of socialism, the spiritual equality of religion and the love of humanity of our noble profession, to lift the dregs of our race from the filth and squalor which endanger the public health. Shall we undertake it?

Surely every worthy member of our beloved profession believes in the brotherhood of man. This belief implies certain principles and entails certain duties and responsibilities. Some of these principles were enunciated by our fathers in the Declaration of Independence as inalienable rights. Another was not stated by them, nor is it contained in the Monroe doctrine (however enthusiastically we love and will fight for that principle), but it is this : Every man has the right to enjoy good health without interference therewith by his neighbors.

These remarks are made as a basis for a plea in behalf of the poor. It is the speaker's opinion that a great work is necessary amongst the poor before medicine shall have reached the accomplishment of its duties and responsibilities to the people.

How shall the State guarantee to every man the right to enjoy good health? The only rational answer to this question is that the State must remove, as far as possible, every means of exposure. One of the most common means of exposure to infectious disease and the spread of the disease is uncleanliness. The State should require that every house and household shall be in such good hygienic condition that no

charge of fostering disease can be laid to their door. The poor must be required to live in such clean apartments and under such favorable conditions that their homes will not be culture beds for malignant disease germs. It is a well known fact that while malignant acute infectious diseases may spread into the most cleanly and well-ordered houses, they generally originate among the very poor and unclean.

That the State can interfere in this matter in a practical way and in a large measure eliminate this cause of infectious diseases is the proposition I wish here to maintain. In the discussion of this question it is proper first to state what is necessary to be done, second what has been done, third what remains to be accomplished, and lastly to suggest some method by which the end we seek can be attained.

First. It may be briefly stated that everything about a house should be clean, and closets and plumbing should be kept in good order. All refuse material and garbage, so far as possible, should be burned, and bathing of the body ought to be encouraged. Drainage ought to be perfect and drainage pipes washed sufficiently often to keep them clean. Every house must be well ventilated, including ventilation of the basement or cellar. In the country and in villages the custom of banking up the foundations of houses with manure from the cow stable and horse barn must be prohibited, and other means of protection from the cold adopted. In cold weather some means of ventilation in the houses of the poor should be prescribed which will allow the air to be warmed before it is admitted into the room, or some arrangement ought to be adopted by which it may pass around the stove before it enters the living apartments. Careful medical surveillance of homes invaded by contagious diseases must be persistently enforced to prevent the spreading of such diseases from these centers of infection. The fearful ravages of the

epidemics and endemics of infectious diseases in the past have taught us that self-protection demands that we shall act as our brother's keeper whether we have accepted the moral obligation of that teaching or not.

Second. What has been done to correct these conditions and remove these causes of disease? It is with pride we can say that in the main our American cities are cleaner and more wholesome than the average European and Asiatic cities. The death rate has been materially reduced in New York, Chicago, Philadelphia, Baltimore, Cincinnati and other American cities. The commissioners of health in some of our larger cities deserve great credit for their professional devotion to this department of preventive medicine and the faithful discharge of their onerous duties to the public. The introduction of better methods of treatment, including the antiseptics and antitoxines, has greatly reduced the ravages of these diseases.

Third. What remains to be done? It is of inestimable value that methods of treatment have been discovered which cut the disease short in some instances and methods of inoculation found which remove the susceptibility to the disease in others; and we do not undervalue the vast importance attached to burning or otherwise totally destroying garbage.

However, a still more important matter in many instances is that which relates to the individual, to his manner of life, and to the home in which he lodges. All of the important work which has been done, inoculation, correcting water supplies, superintending drainage and burning garbage, etc., must be continued with unabated fervor; but in addition to that the individual's body and the house within which he resides must be kept clean.

Fourth. How shall this desirable end be reached? As this question deals directly with the very poor, a subject which

would require much time and labor fully to present, we may begin our discussion by stating our conclusions. There are two problems to be solved: 1. How shall we give our poor better houses? 2. How shall we supply the poor with proper facilities for bathing?

A careful survey of the field before us will surely convince us that if pestilence is to be driven from our communities, the cause of that pestilence must be removed. How are the poor to remove the conditions which are the result in large part of their poverty? They cannot do it. Then in self defense the people must undertake the work. By charitable contributions? No. One of the evils of our day is a misdirected charity. As a general principle, food, clothing, fuel and the necessaries of life ought not to be given without compensation. This, of course, does not refer to the sick and unfortunate who cannot work. Every one who can work, however, ought to earn his bread. It is a well-known fact that a condition of idleness is unhygienic and that a man continuously unemployed cannot enjoy perfect health.

He ought to have some kind of work, at some rate of wages, so he can pay some price for the food and clothing he requires.

Furthermore, it is greater philantrophy to help men and women to earn a living than it is to feed them gratuitously. Not only that, but most men and women prefer to work and earn their daily bread. There is no doubt that the wholesale method of feeding beggars at the door has encouraged the large army of tramps in our country to continue in the business of traveling from town to town begging food. This class of men must try to reach some large city for protection during the cold weather, hence the great increase of charity hangers-on in some of our cities in winter.

However, there are good and honest people who stay at

home and try to get work who sometimes become objects of charity. Their homes are poor, their clothing is ragged; they have no fuel nor food and live without bathing. What is to be done for these? They must be clothed and fed and they must have fuel.

Help must come from those who have the means. The man of large means who invests his capital in some manufacturing enterprise and thereby gives large numbers of men employment is a public benefactor; and to those who are employed and saved from suffering, he is a personal protector. But these benefactors are few when compared with the poor of the nation, and if we are to be protected from the evils we are now considering, it will require governmental aid.

It would be impossible in a brief address to set forth in detail the manner in which this may be done or the extent to which it might be proper to push such an undertaking. Indeed, my chief object to-night is to show that a responsibility, almost an emergency, exists in the field of preventive medicine and that this responsibility rests upon the State; but I do not expect to be able to present more than an outline of what seems to me to be a partial possible solution of the problem before us.

The following propositions will express our ideas of what is required:

1. The State or municipality should give men who cannot secure other work some kind of employment which will afford them a living.

2 This may be done by introducing such public improvements as will add to the comfort of the people or otherwise benefit them or enhance the value of property.

3. A minimum rate of wages should be paid so that only those who cannot find work elsewhere would seek such employment.

4. All able-bodied men without work, who have no visible means of support and who do not apply for such government employment, should be subject to draft for this labor.

5. The unfortunate and disabled poor should be cared for as wards of the State. Religion, humanity and civilization demand this.

6. The State should see that the poor are properly or comfortably domiciled, in houses provided with good ventilation, supplied with good water and sufficiently warm. If possible houses should be furnished with bathrooms.

7. Inspection of the homes of all the people should be conducted regularly and thoroughly, whether in public or private houses; the object of this inspection being to see that they are in good sanitary condition.

8. All foods put upon the market—meats, vegetables, fruits, dairy products, milk, manufactured products, etc.—should be inspected as to their source, composition and present condition.

9. Public baths should be established where the poor can have facilities for bathing, free or at a nominal cost.

10. These provisions should be enforced under conditions which will not interfere with the freedom of a liberty loving people.

Many arguments might be advanced to maintain the first proposition here presented; but we shall claim it as a matter of justice and self defense,—justice to the poor and self defense on the part of society. We say this is a matter of justice because it would be unfair to require conditions of men which for lack of work they are unable to meet; and without proper food and rainment these people cannot meet the first requisite in the struggle to keep well. Such charities as here suggested—helping a man to help himself—will eventuate in greater

good to a greater number, than is accomplished by many misguided efforts at benevolence. It is only an act of justice to give the unemployed some occupation, because we must require of them conditions of life which demand the expenditure of money; but the poor have no money if without work, so they must be supplied by the public; and we believe the only money which should be given to a healthy person is that which is earned by labor.

However, it is not simply a question of the interest of the individual who receives the money, the community interest is to be considered. The element of self defense is a prominent phase of this question. The law of self-defense is as surely a right of society as of individuals. Society has the right to protect itself against war and pestilence, or any other menace, even the menace lurking in expectorated tuberculous matter and tobacco juice.

The great enemy we have to fear is disease. We are not in danger of being overrun by an Alexander, a Cæsar or a Napoleon. The Indian outbreaks on the frontier have ceased to disturb our rest. Indeed the life and death struggle of our Cuban neighbors scarcely aroused us from our dream of peace, still when we were aroused we leaped to our guns in a spirit of loyal self-defense. However, the spectre of an epidemic of infectious disease fills us with alarm and sends us flying from the field of action. We have a right, then, to enforce conditions which will protect us to a greater or less extent from the causes of epidemics. Having the right to compel individual families to be clean, it is but fair that we should furnish the means to those who have them not. This self defense is of as much interest to the poor as to the rich, for love is as strong in the hut as in the mansion. The mother who is unable properly to feed her child, experiences just as great

anguish when it suffers with disease, as the mother who knows not what it is to be without luxuries. Hence the poor cannot look upon conditions as hard, which will help to protect their own households.

What employment shall be given to these people? I cannot enter upon a discussion of this phase of our subject, but I may offer a suggestion that for a time, at least, street and alley paving, cleaning and repairing, removal of garbage (for burning) and waste matter of all kinds in cities and towns will furnish occupation for some, and the beautifying of the municipality with public works will give work to others. Road building and repairing are legitimate fields of labor in the country.

Another means of relieving the sufferings of the poor by furnishing them employment, and in a measure giving them food, may be found in the cultivation of waste places and unoccupied areas of land—making garden spots, as it were—in cities and villages These areas may be leased or rented by the government or local civil authorities for this purpose. Only nominal rent need be paid in most instances, and often the use would be given cheerfully by charitably disposed owners.

Flower gardens, local parks and vegetable gardens might be located in such places, according to the vicinity in which the space is found. A little thought given to this matter will enable us to see that between beauty and utility lies a vast field in which labor may be wisely bestowed on neglected and ordinarily useless pieces of vacant ground and great benefit be brought to unemployed citizens and deserving poor. If time could permit we might mention other means of employment. We may remember, in this connection, that the law of supply and demand has this as one of its features: A supply creates

a demand, and a demand finds a supply. Very little more money would be required for this than for other methods of benevolence, the raising of money would be more evenly distributed, all who need help would receive it, and the demands of hygienic living could be more perfectly carried out.

The proposition that only minimum wages must be paid is based first upon a need for economy on the part of the State or municipality, and second, upon the opinion that people should not be encouraged to be constantly depending upon government employ for a living. It is to be borne in mind that the government should open these avenues of employment, not as a matter of business or to compete with private enterprises, but primarily to give its citizens occupation, and secondarily, though more important, to keep the community in better health.

If it is advisable to give employment to those with no occupation the State must have the right to enforce labor. The right to draft into this service is no greater burden than that of drafting for military duty. Further, if there are those who desire to eat the bread of idleness at the risk of being unjust to their neighbors or becoming a source of danger to the community, then the principle of self defense may be invoked to justify drafting such persons.

The speaker believes that the great majority of the poor and unemployed would prefer to earn their bread by honest toil than to be fed upon the charities of their fellowmen, and that drafting would seldom need to be enforced.

The importance of the health of the people in the community is so great that the State has the right or should have the right to inspect homes and tenement houses to see that they are kept in good sanitary condition, and this inspection should be conducted at such intervals as will give a sufficient guaranty that the precincts are in wholesome condition.

In reference to public baths it may be said that the health of the people can be materially benefitted and the progress of preventive medicine greatly aided by the establishment of houses where the poor and those who are not provided with bathing conveniences may enjoy the luxury and the hygienic necessity of bathing, at a nominal cost or entirely free of expense.

Another feature of preventive medicine of the greatest importance is the prohibition of the marriage of diseased individuals. The physician cannot struggle successfully with this problem single handed. The State must stand as the guardian of its people, prospective as well as present. Disease will not be successfully controlled until marriages of consumptives, syphilitics and those suffering from other constitutional diseases are prevented by law.

How shall the legislation be accomplished which will bring about these desirable results? By the influence of intelligent citizens, the members of the medical profession and their friends. The day has passed when physicians might be excused for not using their influence for the securing of proper legislation. Physicians must be men and citizens and let their influence be *felt.*

Who has more at heart the welfare of the poor and who can do more for them in legislative halls than the physician? No one. Who is the butt of sarcasm and of ill-tempered jest upon the witness stand? *The physician who wields no political influence.* Let us wake up then and assert our rights of citizenship; and our influence in behalf of the poor and our efforts to prevent disease will be felt by legislators, and the laws we need to aid us may be enacted.

Already the light of the twentieth century begins to streak the eastern horizon and we look with anxious and longing

eyes for its fuller dawn and for its rising sun. In that bright new day we shall hope to see the noble physician's ideal of man—an intelligent mind and a loving heart in a healthy body. In the grand procession of humanity to this high ideal, this realization of the perfection and brotherhood of man, the medical profession should lead the van.

AN ADDRESS.

"State Control in Medicine."

BY J. W. PETTIT, M. D., OTTAWA.

[THE ADDRESS OF SECTION THREE.]

Those who look upon recent attempts to regulate the practice of medicine by law as an innovation may be surprised to learn that even in colonial times there were medical laws.

The first attempt at medical legislation in this country was in the city of New York, in 1760. An act in that year recites that "many ignorant and unskillful persons take it upon themselves to administer physic and practice surgery, to the endangering of the lives and limbs of the patients," and required an examination and certificate of approval by the mayor and several civil officers, none of whom were physicians. This was followed, half a century later, by a repeal of this local law and the enactment of a State law which required three years study of a graduate of a college, or four years if not. From time to time many changes were made in the law, but the object of all of them was to encourage a higher medical education and protect the public from ignorance and fraud. These were all crude and ineffectual in accomplishing what was desired, and while not to be taken as models for our guidance, their existence shows the early recognition of the fact that State control in medicine is necessary.

It is useless, for the purpose of this discussion, to recite the subsequent history of medical legislation further than to note the fact that statute after statute was made, altering, modifying, "enlarging and restraining" the rules of law regulating medical practice and the status of the medical profession. As the profession grew in numbers and influence, medical societies were formed upon whom was conferred the licensing power. This function was loosely performed, the result being that in a few years no restrictions were placed upon those who desired to enter practice.

This was the state of affairs until 1877, when a few public-spirited physicians procured the enactment of a law in this State, making a diploma a requisite for practice. Being, as it was, a pioneer movement, much opposition was encountered, both in and out of the profession, in securing its passage. In view of the professional and political conditions existing at the time, its enactment was justly regarded as a great victory for legitimate medicine. The effect of the law was to drive more than two thousand quacks out of this State into other States where they could ply their nefarious traffic without the embarrassment of legal restrictions. The apparent success of our law stimulated other States to enact laws of similar character, not only with a view to raising the standard of medical practice but as a means of self-protection from the horde of quacks driven from our State. For a time the evils of medical incompetency and lawless quackery were materially suppressed. The legality of the act was tested in the higher courts and its essential principles sustained. But the victory was not to be so easily won. Then it was that the cunning scheme was devised to defeat the law by complying with its provisions. If a diploma was all that was necessary and no restrictions were placed upon how it was to be obtained, the way was easy.

Inasmuch as prior to this time it was optional whether those engaging in practice held a diploma or not, it was a badge of honor and was justly regarded with favor by the profession and the people. It was not anticipated, however, that it would become an article of merchandise. Advantage was taken of our loose charter laws, ostensibly to teach medicine, but really to engage in the sale of diplomas. Some of these so-called colleges required nothing but the payment of a certain fee for a diploma. This was such a flagrant evasion of the law that it was not generally successful. Other schools of a little higher order were organized, not only for the purpose of supplying this class with the coveted diploma, but to enable aspiring doctors who made some pretense of respectability to dub themselves professors, which the success of legitimate medical teachers had demonstrated was a profitable means of advertising themselves. In order to get students, fees were lowered, the requirements for graduation made to conform to the ability of the candidate, and other disreputable means employed to secure patronage.

There are now in the city of Chicago alone twenty-one chartered medical schools, of all grades, from the best in the world down to those which have little more than a pretense of teaching force or equipment. Hundreds of incompetents are turned loose every year upon a confiding and unsuspecting public, whose legal standing is the same as the students graduated from the best colleges. These facts are very generally known to the profession, but not to the people, who are the parties most interested. Thus it will be seen that the time-honored diploma, which it was supposed would deliver us and the people from the thraldom and disgrace of incompetency and charlatanism, has been wrested from us and used to compass our defeat.

Our State Board of Health has attempted to stem this

flood of incompetents and vandals by refusing to recognize diplomas from colleges not in "good standing." This has operated as a check but not a bar, nor from the very nature of the case is it possible to do more. Not only have these low grade schools attracted the wilfully vicious, but the confiding and impecunious student, whose intentions are honorable but who does not discover his mistake until too late to correct it. Even the best of our schools, being, as they are, private enterprises, have been compelled to lower their standard of requirements, and be more lax in their enforcement, because of such competition. To such a low estate has the American diploma fallen, that it is not recognized by European colleges or governments, the authorities at Berlin even going so far as to deny graduates from this country the right to the letters "M. D." after their names in their catalogue, though granting it to graduated students from other countries. We may rail at the European authorities for such action, indulge in expletives, and breathe vengeance upon them for what we regard an injustice (which it undoubtedly is in many instances), but the truth must prevail, and we might as well admit that, as now conducted, medical education in this country falls far below the European standard. Making due allowance for the newness of our institutions in comparison with theirs, it is reasonble to conclude that this is the penalty we have paid for attempting to make a diploma the sole requisite for practice, without placing restrictions upon the method of obtaining it. So insidiously have the evils of the system developed, that we fail to recognize its absurdity until forced upon us, and even then our pride prompts us to shift the responsibility for failure to other causes than the inherent defects of the system itself.

The profession had hoped and expected much from our present law and its failure has been a humiliation and dis-

appointment. The State Board of Health, which is charged with its enforcement, has been severely criticised for not using the authority that was supposed to be conferred upon them. The failure was believed to be due to timidity or incompetency on their part. This body in turn have tried to retain the confidence of the profession and the public by attempts *to regulate* the colleges, and although in many instances they have exceeded what is believed to be their authority, it has been found impossible, or at least impracticable. Gradually it has dawned upon the profession that our medical practice act is simply a "scarecrow" which frightens the timid into compliance, but is no menace to the bold, unscrupulous charlatan, the very class for whose suppression such laws are mainly intended. The profession have lost confidence in the law and the people are deceived and imposed upon by being led to believe they enjoy a protection which does not exist.

The disappointment that grew out of the failure of our present law caused the profession generally to doubt the efficacy of legislation as a means of purifying the sources of medical life. This led to a feeling of hopeless indifference, until recently they began to realize that it is the method and not the principle that is wrong. Hence the present movement for a new law which has been so auspiciously inaugurated and to the advancement of which a large part of the time of this meeting of our society will be devoted.

Even before laws were passed making a diploma a requisite for entering upon the practice of medicine the tendency to lower the personnel of the profession by the multiplication of medical colleges was recognized. As early as 1824 the New York State Medical Society saw the cloud on the horizon and adopted a resolution setting forth "that in their opinion the increase of medical colleges was not required for the public good; and that it would be decidedly injurious to the best in-

terests of the profession to charter any additional schools." The president of the society a year or two later, said, "We are constituted by law the guardians of the public interests in so far as they can be affected by medical education, and to what extent such responsibility reaches, I almost fear to say—let conscience answer. Unless this Society suggests some decisive measures to arrest this wholesale manufacture of physicians, by more particularly determining the qualifications which shall admit to license in this State, the consequences must be alike disastrous to the respectability of the profession and the interest of the public." In speaking of a remedy for the evil, this far-seeing man suggested as the one most easy and effectual, "A positive law which shall separate the license from the degree. The separation of licenses from degrees appears to be the more necessary since to the inordinate multiplication of them almost all the faults of early medical education are justly chargeable." In the light of subsequent events this language was prophetic of the evils that are now upon us.

Profiting by our own experience and that of other States, the legislative committee of this Society have, conjointly with like committees from the State Board of Health, the Homeopathic and Eclectic State Societies, prepared a bill which has the approval of the profession of the State, which provides for the creation of a State Board of Medical Examiners who shall pass upon the qualifications of those who hereafter enter upon the practice of medicine in this State. Under the provisions of this bill a diploma is made a requisite for an examination, but does *not* confer the right to practice. The bill is framed on such broad lines that no restrictions are attempted to be placed upon any system or method of practice, but provides simply that the candidate shall be educated in the fundamental branches common to all schools of medicine. Exper-

ience has demonstrated that the more thoroughly physicians are educated, the narrower is the limit of their differences, and that an educated physician, if honorable, may safely be intrusted to practice as he pleases. Unfortunately it has taken us too long to learn this fact, much valuable time being spent in profitless disputation over differences that would have regulated themselves had we been as energetic in our efforts for a more thorough medical education as we were in trying to dispel medical heresies. It is an auspicious day for legitimate medicine when the better elements of all so-called schools come together to work for the common good. There is a catholicity of spirit about such a movement that augers well for the future. The differences between the better educated of all schools are more artificial than real and harmonious action in this matter of medical legislation can ultimately lead to but one result, viz: the wiping out of sectional lines in medicine. "A consummation most devoutly to be wished."

The bill now under consideration by the various medical organizations of this State, provides for a Board of Medical Examiners whose duty it shall be to determine whether those who have been graduated from the medical colleges have the qualifications certified to in their diplomas. These examiners are to be legally qualified physicians and may be of any medical faith. No restrictions or limitations are placed upon the course of study necessary to prepare one for the examination, it being provided that: "Such examinations shall be in English language, and embrace those general subjects and topics, a knowledge of which is commonly and generally required of candidates for the degree of Doctor of Medicine by reputable medical colleges in the United States." Such a law is freed from the bias of sectarianism and is so elastic as to admit candidates of any recognized school, provided only that he is well grounded in the fundamental principles of medicine.

The plan proposed is substantially the same as now in force in New York, Pennsylvania, Minnesota and several other States, where it has proven eminently satisfactory; more so than any method heretofore in vogue, as is evidenced by the following extract from the last report of the New York State Board of Examiners: "Since the establishment of the system at present obtaining, 2832 doctors of medicine have applied for the right to practice medicine in our State. Under the old law each one of these would have been entitled to practice his profession unquestioned on registering his diploma at a county clerk's office. Of these 927, or 29.2 per cent., were found incompetent and deficient. A system which has saved the State from numbering among its legal practitioners of medicine so large a percentage of persons whose presence as such must surely have worked harm to the community, and must have detracted from the worth and dignity of our profession, needs no encomiums at our hands." They also say: "We are satisfied that to-day the laity, as well as the profession, would not for one moment permit a backward step in medical education or legislation in the State of New York."

In Pennsylvania the results have been equally satisfactory. Out of twelve hundred and sixty-six examined, one hundred and seventy failed. The Examining Board reports: "There has been a decided change in both public and professional opinion concerning the benefits attainable. Those who have been licensed are most ardent supporters of the law, and, scattered as they are throughout the length and breadth of the State, their influence and interest is manifest. Professional pride has been stimulated. The profession at large are taking more interest in medical education and the public now recognize the necessity for the law and appreciate the advantages accruing therefrom to themselves." Equally strong endorsements of the plan of separating the teaching from the licensing power could be cited from other States.

The success in these States proves conclusively that the plan we propose is no longer an experiment, which should remove all doubts and put a stop to petty quibbling. Some of the arguments against the plan are too absurd for contradiction and it would be a waste of time to do so, were it not that the prominence of the men who give utterance to them is apt to give them weight. One of these is, that it will work a hardship upon the impecunious student to put him to the additional expense of twenty or twenty-five dollars, at a time when his resources are exhausted and his earning capacity limited. This is in line with the argument for the poor widow's cow, who, it is insisted, must be allowed to trample down other people's door yards in order to obtain a living. They fail to recognize the principle that runs through all law, that individual interest must yield when it runs counter to the public good.

Another frivolous argument adduced is, that examining boards may be unfair. So they could; but would they? The best answer to this argument is, that during the twenty years of the existence of our State Board of Health no charge of unfairness has ever been made against it. Even with the strained relations existing for so long between the different schools represented, and with one and the same school always in the majority, no charge of unfairness has ever been made even against the majority who had abundant opportunity to be unfair, had they been so disposed. This Board has, for the most part, been composed of intelligent, conscientious, upright men who have, under most unfavorable conditions, done much to advance the interests of the profession and the public, and it is a libel on them to make such an insinuation.

It is also argued that, while the principle may be right, the methods adopted to put it in practice may be very defective in their scope and operation, and thus defeat the object in view.

There is much reason and logic in this position, and it should serve to put us on our guard. We are not so Utopian as to believe that the bill proposed will cure all existing evils. We do insist, however, that it will be an improvement over present conditions. We are not working for an ideal law. We will never need ideal laws until we have ideal conditions; then we will have no use for statutory law.

The common mistake made heretofore has been that attempts were made too much on the line of our code of ethics, which, while theoretically right, is too ethical to appeal to the intelligence and conscience of the public. Over-legislation is apt to recoil. In a government like ours such boards cannot rise above the level of the people or above the level of the profession as a whole ; but they will grow better with the experience acquired. This will be particularly true if the members of the profession, who are seeking for better things, will come to their support instead of holding aloof and finding fault. Because we cannot get everything we want is no reason why we should not accept what we can get. All reform movements should be evolutionary, not revolutionary. We should recognize the limitations which hedge us about. We should bear in mind that many a righteous cause fails because we undertake too much ; for, as Dr. Holmes has well said, "Error is got out of the minds of those who cherish it as the tape worm is removed from the body, one joint, or at most a few joints, at a time ; rarely the whole evil at once."

Above all, we must keep in view the fact that the law for which we are striving is primarily for the public, and that whatever advantages may accrue to the profession by such a law must be incidental to the public good. We should make it clear that this regulation is not to protect the profession but to give to the people a reasonable assurance that a class of persons upon whom life, health and the prevention of dis-

ease depend should have some moral and educational qualifications.

We must not be discouraged if the public, in whose interest we are laboring, look with distrust upon our efforts to serve them. We are not to be judged wholly apart from the influence of our time. In this commercial age it is difficult for the average citizen to realize that men can be inspired by lofty ideals and unselfish purposes in their professional and business life. Hence we must not complain if our efforts are charged to mercenary motives. However, it ought not to be difficult to demonstrate that any movement that will give the people better service should receive their support.

Not all the quacks are such from choice. Many a young man has entered upon his professional life with high hopes and resolves, soon to find himself, by reason of faulty instruction, unprepared for its responsible duties, and wanders from the paths of professional rectitude into quackery and empiricism. Many a young man who would otherwise have been an ornament to his profession has been wrecked upon the shoals of empiricism and quackery because of this imperfect preparation. Believing he was prepared because his alma mater said so, he lost faith in medicine as a science and accepted the doctrine so often expressed by the unprofessional, that the practice of medicine is simply a big confidence game and that he succeeds best who deceives the public most. How many of us who were graduated under the old two term system in vogue twenty or more years ago left college under the delusion that we were doctors. What a host of contending emotions and opinions we experienced when we failed in obtaining the results we expected in our practice! I will not call upon you to answer how many of you have run the gamut of medical faith from blind credulity in the dogmatic teaching of your professors to the therapeutic nihilism so plainly stamped upon the profession to-day.

But further argument in support of the necessity and advisability of State control in medicine is useless. The question that remains is, How shall this be accomplished? The responsibility for working out this reform rests with the medical profession, where it properly belongs. If the profession of this proud State, that was the first west of the Alleghanies to lead off in this movement, would regain their self-respect and secure their just requests, they must organize and vote together. A body of ten thousand men, scattered all over this State, as we are, will then amount to something in the eyes of candidates for the legislature, but a body of men simply representing an important idea are of no use in politics. As politics are conducted in this country, organized bodies of voters alone have any influence. The usual method adopted in our Society meetings of demanding reforms by passing resolutions is well enough as an expression of sentiment, but amounts to nothing more. It is about as effective in working medical reforms as were the efforts of the Dutch to repel the invasion of the Yankees from New Amsterdam, by marching up the hill, issuing a proclamation to the Yankees to disperse and then sitting down to smoke while waiting for them to do it. I am pleased to note the fact that we now have the profession of the State organized by senatorial districts, and before a candidate for the next legislature can receive the vote of any respectable physician in his district, that physician must know that in the event of his election he will vote for the bill endorsed by this Society. Our professional duties will not as a rule permit us to accept legislative offices, but we have in our power to very materially contribute to the defeat of any candidate who refuses to represent our interests.

It is the pleasant custom on occasions like this to felicitate ourselves upon the wonderful achievements of medical science, which certainly have been great enough to satisfy the most

exacting, and to point with pardonable pride to the bright galaxy of illustrious names of men living and dead whom we delight to honor. All this is very appropriate, but we must not lose sight of the fact that unless the standard of the general practitioner is high, neither the educated nor the uneducated classes of society will know how to distinguish him from his quack neighbor. It is not a few prominent men who are widely known who give status to the profession, but the thousands of general practitioners who mingle with the masses in city and country. The science of medicine will continue to progress in the future as it has in the past whether we have restrictive laws or not, but if the great body of the profession, and through them the public, is to derive the greatest possible good from this progressive movement, then restrictive measures are necessary.

MALNUTRITION IN INFANTS.

BY FRANK PARSONS NORBURY, M. D., JACKSONVILLE.

The study of child-life has ever been the favorite theme of motherhood, but the rational study of the natural history of child-life from the standpoint of the physical sciences is comparatively new. The same may be said of the rational study of the child in disease, for while children have been born in the world, have been actors in successive generations, in the panorama of disease, yet it has been but a few years since the diseases of children have been dignified with the importance to give to them a distinct field in the great realm of clinical medicine.

The infant has been discovered to be not a little man, nor even a little child, but a distinct human entity, having its own physiology, its own psychology and largely its own pathology. In fact, when we enter upon the study of infancy from the standpoint of infancy, we find revealed a little world of medicine all by itself. We find problems presented which demand from us precise and anaylitical study. The problem which is the problem *par excellence* of an infants' life is that of nutrition. This is of paramount importance as the days of infancy are dependent upon the ability of the infant to receive and assimilate nourishment. Simply because the child is a feeble weakling at birth, without sufficient potential reserve to warrant its continued existence, is no excuse for its receiving scant or no attention whatever. Who knows but in that frail frame reposes a mighty Stephens, a Walter Scott or a Ben

Johnson, all of whom were regarded when infants as hardly worth the breath of life which fanned their precarious existence. Nutrition, then, is the problem of infancy. In the normal infant, blessed with a mother who fulfills the demands of motherhood, there is not much concern regarding the present or future nourishment of the child. But given an infant where heredity, intercurrent disease or other circumstances compels the little one to fight for its life against heavy odds, then it is that science comes to the rescue of such an unfortunate one and enables a more determined struggle to be waged. Nutrition is a physiologic-chemic process, which has for its object the supply of materials necessary to maintain the human economy in a state of health and to provide for its growth and development. In an infant body metabolism is more active than in an adult. Not only must the nitrogen equilibrium and the carbon equilibrium be maintained, but a sufficient excess of food must be properly converted into its end products and distributed to the tissues and stored in the body to act as a reserve supply of nourishment. Growth and development draw upon this continued and reserve supply for the purpose of replacing tissue, yielding energy and promoting growth of the inactive structures of the body. Disturbance of the harmony existing in the normal operation of the chemistry of nutrition is apt to engender the malnutrition and upset the normal body metabolism.

The etiology of malnutrition is in some cases obscure ; the infant born at full term of average weight, nursed by the mother whose milk is apparantly digested and assimilated, yet the infant does not thrive and ere long shows decline, marked malnutrition and ultimately death follows.

Such a child is, no doubt, one of the unfortunate ones whose inherent potential is far below the standard of human existence and life ebbs away simply because its race is run.

The digestive processes, while they lasted, were normally performed, but some inherent defect prematurely ended existence. As a rule, most all cases of malnutrition are the result of gastro-intestinal disorders incidental to errors of diet. The indigestion or dyspepsia of infancy exists in reality, and while much of it is the result of the modern tendency of substitute feeding, yet it does result oftentimes from the mother's milk. Babean hints that over education of the mother is responsible for her lack of ability to supply wholesome milk. Again other conditions, such as excitement, worry, neurasthenia, the occurrence of menstruation or gestation may produce unfavorable results upon the milk and thus disturb its nutritive value. In the great majority of cases, however, artificial feeding is responsible for the indigestion. This is the result, first, of faulty methods of the administration of foods, and second, the promiscuous and heterogeneous selection of food stuffs, prescribed by the neighbor or parent. Artificial feeding, we must remember, is becoming intensely popular, largely due to the instrumentality of the lay press, which through its advertising columns seeks to encourage by means of photographs, etc., the belief that it is simple, uncomplicated means of nourishing the child and a great relief to the new woman who seeks to be relieved from her God-given burden of feeding from her own substance, her offspring. While many infants succeed in sailing between the Scylla of faulty methods and the Charybdis of unwise selection of food stuffs, because of inborn tenacious hold on life, many more sink on these rocks or in the waves of ignorance and superstition which are overwhelming, especially among the poor and uneducated. If the scientific principles governing artificial feeding could be instilled into the common knowledge of the people we would have less contention with malnutrition. The gastro-intestinal disease inaugurated by faulty feeding

begins the way for the invasion of conditions unfavorable to normal nourishment. The indigestion once established is very apt to be a constant source of trouble and when coupled with a feeble resistence on the part of the child, encourages a chronic condition of intestinal indigestion. But if the indigestion—marked in the simple statement of the mother that the food is not agreeing with it—is corrected at once, malnutrition may be nipped in the bud. Otherwise the process insidiously goes on and is outlined as follows: First, a change in the color and frequency of the stools. The stools are green either when passed or become so a little later; this shows an alkaline condition of the feces, due to a suppression of the normal acids. Bacteria, according to Lesage, cause the change in color. The frequency of the stools is marked, the quantity is lessened, but the discharges are offensive and irritating. Nervous symptoms soon appear, restlessness, crying, peevishness and sleeplessness. The child wants to be held.

Then even at this stage more complicated nervous symptoms may appear such as the so-called "inward spasms," a simple tremor involving the eyelids and extremities. Convulsions, too, may appear now and often are the first marked symptoms which decide the parents to call a physician. Confusion in diagnosis may result because of the nervous symptoms, as I have seen in consultation practice. Malnutrition is sure to be in evidence, however, as the wasting is observed, the child having lost weight or there has been no gain in weight for a long time. The mother remarks that she feeds the child often enough and if she is nursing it at the breast, she is very apt to say that the child constantly demands the breast or else he never seems satisfied. The very appearance of the mother will lead to a diagnosis in such cases, as she is usually an overworked, constantly tired, anæmic individual,

ladened perhaps with the responsibilities of other children and the care of the home. The prostration of the mother is reflected in the child and they both together present a striking picture which enables us to a pronounced diagnosis. Up to this stage there may be no marked evidence of structural changes, but it is very probable that a catarrhal colitis is present, in which case there is apt to be hyperplasia of the lymph nodules. These symptoms are reinforced again by the evidences of impaired bodily metabolism. The presence of uric acid in the urine is an important symptom, as Herter says, it is to be taken as an evidence of destructive metabolism in the nuclei of the cells of the organism and represent the chemic reaction constituents of the nuclei and certain poisons. This view sustains the modern physiologic chemic belief that uric acid is a terminal product of metabolism and in itself not a poison in chemic reaction.

Uric acid in the infant, not infrequently in its passage, irritates the urethra causing the child pain when urinating and on this account even an infant will not void unless driven to it, because of the pain which accompanies such evacuation of the bladder. Or again, the presence of uric acid may cause irritation of the bladder and so disturb the reflex as to cause constant dribbling of the urine.

As further evidence of the faulty metabolism, we have other symptoms indicating auto-intoxication, viz., the glands are enlarged—the groin and neck being especially involved. The patient has now reached that stage of wasting which Parrott calls the second stage of gastro-intestinal catarrh. The weight gradually declines ; the child being thin and cadaverous, it has an old appearance—the skin loses its elasticity, especially around the gluteal region, over the deltoid and on the thighs. The skin wrinkles and soon, by the wasting of adipose tissue, it resembles tissue paper. The child is pale,

anæmic; has an offensive breath, the lips are thin and pale and the eyes look sunken, which appearance is intensified by the dark circles which are under them.

Blood analysis shows a diminution of the number of red blood corpuscles and an increase of leucocytes; diminished hemoglobin. The temperature may be subnormal, as in one of my cases where it continued so far some time, or when there is a marked increase of the symptoms of auto-intoxication, it is usual to find the temperature elevated from one to three and even four or five degrees. The pulse is feeble and rapid (90 to 120) and as exhaustion supervenes it becomes more feeble and more difficult to count. Fenwick calls attention to a fact of interest from the standpoint of prognosis, that with the approach of death, the action of the heart becomes slow and often intermits—sixty beats to the minute has been observed by him in such cases. The respiration is usually increased and shallow, but becomes of the Cheyne-Stokes variety, with the increase of exhaustion and the approach of dissolution. The nervous symptoms are now more pronounced and are apt to be misleading. Convulsions, local spasm, muscular rigidity, exaggerated reflexes, transitory paralysis of certain muscles, mental hebetude, somnolence and coma; spurious hydrocephalus, too, may be one of the unique complications.

The convulsions are evidence of the intestinal intoxication. Herter says, "they are the immediate precursors of a long series of occasional convulsive seizures to which we cannot give the name of epilepsy." In some cases it is impossible and exceedingly difficult to distinguish in certain cases the action of local irritants, operating on a reflex arc, from the action of a poison which through auto-intoxication finds its way into the blood.

A case in point. I saw in consultation a case of profound

malnutrition (infantile atrophy so-called by Starr). I was consulted because of continued convulsions. The child's history in brief was that it was seven months old, of healthy parentage, nursed by the mother and up to the appearance of convulsions was considered to be a healthy child. One morning the mother was awakened early by the child in couvulsions. Forty-five convulsions occurred on this day, when they abruptly ceased, but reappeared within a few days; in the meantime gastro intestinal symptoms appeared in pronounced form. Nutrition was disturbed, the physician treated the case expectantly but the condition became more distressing. The loss of weight continued with an occasional convulsion or series of convulsions to increase the parent's anxiety. The mother continued to nurse the child. When I saw the case, the child presented the picture of profound infantile atrophy. I recommended the abandonment of the mother's milk, the correcting of gastro-intestinal symptoms and the use of modified milk, beginning in attenuated form and increasing as the symptoms would permit, inunctions of cocoanut oil, free use of drinking water and proper hygienic care. The patient recovered after four months' treatment.

The local spasms are usually limited to the motor oculi muscles, but we may have a more general involvement of muscles. The muscular rigidity and the decubitus noticed by the child burrowing its head into the pillow, the retraction of the head, etc., are suggestive of meningeal involvement but these symptoms often disappear under appropriate treatment. The mental hebetude, the somnolence and coma indicate a more profound degree of exhaustion and intoxication. The mental hebetude may last for weeks to be followed at last by somnolence, coma and death.

Pseudo-hydrocephalus, according to Holt, does not show on post-mortem examination any condition of the brain which

bears relationship to the symptoms. The patient presents the appearance of hydrocephalus and it is a rare complication. I was consulted recently by a mother who presented her child because of hydrocephalus. On examination I found a marked case of chronic intestinal indigestion, with malnutrition, or, as she called it, dyspepsia. The case had been referred to me from Bloomington, Ill.

The hydrocephalus was pronounced and the mental symptoms confirmed the distinguishing skull conformity. I was loth to make a diagnosis of acute hydrocephalus, as I found no evidence of rickets, and as the skull conformation was not of the rickety type and as I further remembered what Holt had said as a result of his post-mortem examinations, I made a provisional diagnosis of psuedo hydrocephalus and prescribed for the intestinal indigestion. I have seen and had under my care a number of cases of acute and chronic hydrocephalus, but in none of these did I notice intestinal complications.

I can understand that true acute hydrocephalus may exist at the same time as malnutrition, for it is quite probable that the acute infective process, so conspicuous in gastro-intestinal disease, may give rise to infection within the cranial cavity, causing acute meningitis, which is, as Mills truly says, one of the commonest causes of acute hydrocephalus.

The foregoing symptoms are in brief those found in cases of malnutrition following intestinal indigestion, which, in fact, causes fully four-fifths of all cases.

DIAGNOSIS.

The diagnosis of malnutrition, while not necessarily difficult, yet demands painstaking observation to determine whether or not some of diathetic diseases are not the real source of their infirmity. We should not overlook in our inquiry the possibility of kidney, liver, other intestinal disease or malaria to produce a group of symptoms akin to what we

have here delineated. The ordinary methods of clinical diagnosis should, therefore, be closely followed, using laboratory methods and careful daily observation.

PROGNOSIS.

This is not necessarily bad, for if no organic changes have followed, the prospects for improvement and recovery are encouraging, and the little one may grow in strength and develope its powers without complications, if carefully watched. As Holt says, if the cause can be removed the child will get well. It requires patience, diligence and thorough co-operation of the parent or nurse to insure success. In giving a prognosis I am always guarded and am sure to add that "vigilance in this case is the price of health."

TREATMENT.

The treatment has two main objects in view, first, to arrest wasting, and second, to repair the damage done by the disease. To this end we should be careful in laying out our campaign of action, to be thorough and exhaust every resource before losing hope. We cannot rely on drugs except to aid us in promoting resolution. We must depend largely on the regulation of diet. If the mother is nursing the babe, abandon the breast at once, or else employ a wet nurse; but such a substitute is not always satisfactory, and is usually expensive. In my experience modified milk is the best substitute feeding we can employ, and when used on the basis of percentage and carefully followed, we can build a foundation on which a superstructure of good health can be raised. As the subject of modified milk will be discussed elsewhere on the program, I shall not enter into the discussion of its principles. If a baby does not show improvement on this food, and keeps losing weight, nothing will save it. The atrophy then has involved the organs of assimilation, and hence their

function is cut off and death follows. I have used the method of Meigs in feeding and found it applicable in many cases, but in my judgment the method of Holt and of Rotch leads in thoroughness of scientific principles and practical results. The bowels should be regulated, and if diarrhœa exists no diarrhœa mixture should be prescribed. I saw a case in consultation where a diarrhœa mixture had been persistently used and only served to intensify the symptoms. Intestinal antiseptics have but a limited field of action in these cases, but I do not ignore their usefulness. The subgallate of bismuth and the salicylate of bismuth have pleasant effects in allaying intestinal irritation and to help in overcoming the putrefaction. I feel that the free use of water, both by irrigation and the mouth, and even the use of normal salt solution, after the method used in gastro-intestinal infection, should be employed. Elimination is the theory of this treatment, and it is correct I believe where we have such evidences of auto-intoxication.

I have used freely the local inunction of cocoa nut oil, applying it twice daily over the abdomen, on the thighs, in the auxiliary spaces. It promotes nutrition and relieves the harsh condition of the skin.

Cod liver oil, it should be remembered, has no place in the treatment of malnutrition, because it leads to fat intoxication and thus prevents nutrition.

We cannot ignore the percentage basis of infants' food, and when you disturb this relationship you invite indigestion. It is on this account that artificial feeding on the "try, try again" basis is a failure. (1) Fat, (2) proteid, (3) sugar, (4) salts, (5) water, should be combined on a proper percentage basis, the food to be modified according to the physical indications and ability to digest.

MODIFIED MILK.

BY FRANK SPOONER CHURCHILL, M. D., CHICAGO.

The natural food for infants during their first year of life is mother's breast milk. Infants deprived of such milk should be fed on a preparation as nearly like this as possible ; in the preparation of such a mixture cow's milk must be used as a basis. We are all agreed up to this point, but here we begin to diverge as to the question of details and we find many different methods suggested for converting cow's milk into practically human milk—our standard in infant-feeding.

How is this modification to be carried out? The answer to this question forms the subject matter of this paper. That we may the more clearly understand the problem before us, let us glance for a moment at the analysis (1) of cow's and human milk.

We notice at once several points of difference to be overcome in converting the one into the other. We have on the one hand an acid comparatively concentrated fluid, to be converted into an alkaline, more dilute fluid ; in such conversion the fat must not be altered, the sugar must be increased, the proteids diminished and the solids as a whole lessened. These changes, this modification of the cow's milk, can be made

(1)	COW'S MILK.	HUMAN MILK.
Reaction	Slightly acid.	Slightly alkaline.
Water	86-87 per cent.	87-88 per cent.
Total Solids	14-13 " "	13-12 " "
Fat	4.00 " "	4.00 " "
Milk Sugar	4.50 " "	7.00 " "
Proteids	4.00 " "	1.50 " "
Ash	0.7 " "	0.2 " "

either at the milk laboratory or at home, and I will ask your attention to a brief discussion of these two methods.

We have in the milk laboratory an institution for accurately modifying milk to any degree of dilution we wish. The method consists briefly in this: separation of milk into cream and skimmed milk by centrifugal force, recombining them in definite proportions with the addition of water, lime water and milk sugar. It will readily be seen that by varying the amounts of these ingredients we can obtain an infinite variety of combinations; can, in other words, modify the milk to almost any percentages we wish.

The various steps are as follows: We have, *e. g.*, a normal infant of six months, deprived of his mother's milk, and whom we wish to put on modified milk. We have, perhaps, a short time before analyzed his mother's milk and found that it contained 4 per cent. of fat, 2 per cent. of proteids, the sugar and ash being constant at 7 per cent. and 0.2 per cent. respectively. We will, therefore, write a prescription as follows:

	PER CENT.	REMARKS.
Fat	4 00	Number of feedings.....6.
Milk-Sugar	7 00	Amount at each feeding.....6 oz.
Albuminoids	2 00	Infant's age.....6 mos.
Mineral Matter		Infant's weight.....16 lbs.
		Alkalinity .....6 per cent.
Total solids		Heat at 155 deg. F.
Water		
	100 00	

Ordered for BABY JONES.

This prescription is now sent to the laboratory, and there, according to formulæ, carefully prepared, certain amounts of the different elements are combined to produce these exact percentages.

It is the writer's practice to heat the milk at a temperature

between 65° C. (149°F.) and 70° C. (167°F.) for the reasons stated by Freeman (2) viz.: that heating at this temperature destroys almost all the air bacteria commonly occurring in milk, also the bacillus tuberculosis, b. typhosis, b. diphtheriæ, and many other pathogenic bacteria. It furthermore causes no change in the taste of the milk and avoids those chemical changes produced by higher temperatures.

We have prepared a mixture for a healthy infant of six months. But suppose we have to do with an infant with impaired digestive power and therefore unable to take care of such high percentages. Our modification would obviously be different and we should proceed perhaps, as in a case occurring in the writer's practice, the history of which I will state briefly.

A male infant, weaned at two months, on account of the nervous hysterical character of mother, whose milk showed low fat and high proteids (Holt's method;) infant suffering constantly from intestinal colic and gaining only slowly in weight. After trying in vain to improve the quality of the mother's milk, I stopped it at once and, mindful of the baby's *weak* proteid-digesting power, put him on fat 2 per cent., sugar 6, proteids 0.25. He stopped crying at once, gained slowly in weight, the fat being increased every third day, and the proteids kept at 0.25 till the tenth day, when he was given and took well, fat 3.00 per cent., sugar 6, proteids 0.75. A week later he was given: fat 4 per cent., sugar 6, proteids 1, with disastrous results, vomiting and colic starting up in two days. He was then put on: fat 3.50 per cent., sugar 6, proteids 0.75; did well, and in a week was again tried on fat 4, sugar 6, alb. 1, which he took well for a week, when again digestive disturbance forced us back to: fat 3 per cent., sugar 6, proteids 0.50, upon which he throve for six weeks, when he was promoted to: fat 4 per cent., sugar 7, proteids 1, do-

ing well on this for two weeks, when in hot weather, a slight diarrhœa necessitated a return to: fat 3.50 per cent., sugar 7, proteids 0.50. At seven months, he had been for three weeks on: fat 4 per cent., sugar 7, proteids 0.75, weighed sixteen pounds, had two teeth, the first of which appeared one week before he was six months old, and notwithstanding the erratic course of his diet, his flesh was hard and firm and his general condition excellent.

Here was an infant perfectly healthy at birth, but his digestive powers very early in life impaired by taking his own mother's breast-milk, poor in quality, on account of her nervous, hysterical temperament. As a result of these two factors, poor milk and impaired digestive power, he is weaned at two months, placed on low percentages of fat and proteids, the former of which is rapidly increased, the latter slowly and with difficulty, and he completes his seventh month in good general condition, it is true, but with weak proteid-digesting power, being able to take but 0.75 per cent. proteids, when he should be taking 1½–2 per cent. The case illustrates the trouble which these infants with impaired digestive power entail, the necessity of constant watching and frequent change of formula, and also the great advantage of feeding accurate percentages.

While laboratory-modification of cow's milk is the most accurate method available, excellent results can be obtained by home modification, and comparatively accurate percentages be prepared, provided we can have a milk of known quality as our basis. Such a milk can best be obtained from a herd of cows of common breed and giving a moderately rich milk. For greater accuracy the percentage of fat can be estimated by Babcock's centrifugal machine, or by means of an ordinary centrifuge as described by Lewi.

The details of home modification are so important that I

shall illustrate by preparing a sample according to, *e. g.*, the prescription given above. The milk, as soon as received, is set aside in a cold place, in a glass jar, for about 6 to 8 hours when it is siphoned off, thus separating the cream and milk. These are subsequently recombined in certain proportions.

Rotch, in his work "Pediatrics" (p. 279), gives tables directing what amounts of milk, cream, water, etc., to use to produce given percentages. He has kindly given me permission to copy these tables, and by reference to them, we see that, to fill out our prescription, we are to take the following amounts of the various ingredients:

Fat	4 per cent.	Cream	8 oz.
Sugar	7 "	Milk	2½ oz.
Proteids	2 "	Lime Water	1 oz.
Lime Water	5 "	Water	8½ oz.
Milk Sugar 2½ measures.			20 oz.

This is now divided among, *e. g.*, 6 tubes, placed in a sterilizer—a household double steamer will do—and heated at 150°–167° F. for 20–30 minutes, then put on ice and kept till feeding-time, when a single tube is heated to about 100° and fed to the infant. We can, of course, easily prepare one-half, twice or thrice the above amount. For the sake of convenience 20 ounces has been taken as above.

Such, very briefly, are methods by which we can modify cow's milk to the wants of different infants. Variations in the steps and details will of course suggest themselves to different physicians, according to the intelligence and circumstance of the family. Morse (3) recommends household measures within reach of those having little intelligence and little money and his suggestions will be found of great practical value.

I would suggest, in closing, two important factors to be borne in mind, in considering this subject of modified milk: First, as is emphasized by Rotch, that milk is not a single simple food,

but a combination of foods, consisting as it does of different proportions of fat, sugar, albumenoids, salts and water; and second, that each individual infant presenting itself for treatment must be studied by itself—must be a law unto itself.

One or more of the different elements entering into milk may give trouble to the digestive apparatus; it may be that a child has, *e. g.*, as in the case cited above, low proteid-digestive power, yet be able to take care of fats and sugar with ease; obviously the proper course here is to give him such amount, such percentage of proteids, as he can digest properly. Do not overtax his power in this particular direction. Do not give him a pound to lift when his present limit is a half pound. Rather give him his half pound to lift constantly, regularly and systematically and thus help him to develop power to lift his pound. Give him his quarter of a per cent. or his half a per cent. of proteids at the outset, if that seems to be the limit of his proteid-digesting capacity, and gradually increase it, keeping pace with the growth of all his powers, including that of this particular digestive function.

How easily and simply we can vary these different elements, I trust I have already demonstrated, the method consisting, as it does, merely in combining varying amounts of cream, milk, water, sugar-of-milk and lime water.

The second injunction to study each case by itself, would seem trite in its mention, yet is apparently necessary, so many physicians do I see who disregard it and attempt to feed their babies by routine. Such methods fail. He who attempts them looks askance at modified milk and passing snap judgment upon it, declares it not suited to his cases. He forgets that all babies, nay all human beings, do have and *must* have, in varying proportions, the elements that go to make up milk. We all must have fats, albumenoids, salts, sugar and water for proper growth and nutrition. The physician feeding his in-

fants by routine, forgets that a particular case needs these elements in certain proportions and can't take them in any other proportion. He fails to prescribe the exact combination necessary; at first, is perhaps unsucessful after trying a few days, then gives it up, puts the baby on to a so-called "food" and shooting haphazard, perhaps hits the mark—the proper combination of fat, proteids, sugar and water for that particular infant at that particular age. The infant is satisfied for a while, often developes an excellent line of rhachitic fat and is hailed as a sample result of this particular food. What happens to him later, with late dentition, with late walking, with disordered digestion, with starved and therefore irritable nerves, with his lowered general vitality, and diminished resistance to disease—is too well-known to need mention.

Dame nature is a safe guide to follow. She naturally provides, as the food for the average infant, the mixture indicated in the table. She also allows wide variations for different subjects, and peculiar combinations for individual cases. We see different children fed on different breast-milk of varying quality, yet all the infants thriving. Again we see an infant doing well on his own mother's milk, which, however, is totally unfit for another infant placed upon it.

Let us take these hints, imitate nature as closely and as accurately as we can, vary our combination, patiently and repeatedly if necessary, until we have provided for the infant a diet "easily digestible and sufficiently nutritious."

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INFANTILE SCURVY WITH REPORT OF CASES.

BY ISAAC A. ABT, M. D., CHICAGO.

The earliest reported of these cases were erroneously described as cases of acute rachitis. Moller, of Konigsburg, in 1859 described his first case. In 1862 he reported upon two more cases, one of which came to autopsy.

Bohn, in 1868, described a similar case. The cases reported by these authors show a striking similarity with reference to the symptomatology. The patients had severe pains, attended by swelling of the extremities, along the course of the long bones. Diarrhœas were of frequent occurrence. Scorbutic stomatitis was commonly noticed, the pulse was frequent, the temperature normal. These cases were all accompanied by grave constitutional disturbances. After several months of ineffective treatment with iron and the iodides, a majority of the cases recovered after having been placed under favorable hygienic conditions.

Similar observations were made by Striebel, 1863 ; Adsersen, 1866 ; Förster, 1868 ; Bohn, 1868 ; Senator, 1875 ; Fürst, 1882 ; Weihl, 1883, and others.

Möller referred to the gingivitis and subperiosteal hemorrhage and considered them rachitic phenomena. Förster, 1868 ; Hirschsprung, 1872, described similar lesions as rachitic. Thomas Smith, 1875, first described the hemorrhagic periostitis of the diaphyses of long bones.

We are indebted to Cheadle, of London, 1878, who described the disease in detail as infantile scurvy, later as osteal

or periosteal cachexia with scurvy. Thomas Barlow, of London, 1883, with a rich experience in this class of cases from clinical and pathological sources, went into the detailed pathology. He considered these cases a combination of scurvy and rachitis, the scurvy being an essential constant element, the rachitis being a variable element, in that it is not always present. It is interesting to note that the acknowledged master, Henoch, doubts the existence of acute rachitis of the older authors. He says he has seen many thousand cases of rachitis, that he has never observed an accompanying fever which could not be ascribed to a bronchitis or other acute process. He warns against the possibility of mistaking a case of periostitis or osteomyelitis for a case of rachitis. Of a scorbutic affection no mention is made in this keen observer's writings.

The following cases from my experience illustrate the course of the disease :

A. W., female infant, eleven months old. Parents healthy; the grandmother on the maternal side is affected with diabetes ; both of her grandmother's parents and one sister died of this disease. This is the first child. The labor was a difficult one, and was terminated by forceps. A bony ridge over the frontal bone persists and indicates the position of one blade of the forceps. The child received mother's milk for six weeks. At the end of this time the supply of maternal milk was exhausted. An artificial diet of sterilized milk was chosen. The milk was carefully sterilized, properly diluted and given at suitable intervals. In all, it may be said that scrupulous care was observed in the nursing and management of the child, which thrived fairly well. It was inclined to be constipated, and an occasional attack of dyspepsia necessitated slight alterations in the diet. At one time a mixture of milk sterilized with oatmeal water was used ; at another time,

barley water; again, small quantities of malt extract were added to the milk to sweeten it. Under this latter mixture the child remained unusually free from dyspeptic attacks. The little one made constant and steady gains in weight and flesh; was bright, responsive, and differed in no way from children of a like age.

The lower incisor made its appearance promptly at the sixth month. At the end of the ninth month six teeth had appeared. At the tenth month the child was fed, in addition to sterilized milk, some of the simpler amylaceous foods. The child did not show any trace of rachitis.

When the little patient had become eleven months old the constipation became more marked, the act of defecation had become painful, the fæces at times were covered with a few drops of fresh blood. Examination at this time revealed a number of anal fissures, situated radially about the anus; laterally, on each side, were slight fissures involving the muco-cutaneous surface and appeared as linear cuts. Posteriorly, in the median line, was a larger, broader and deeper fissure with a distinctly red, ulcerated base, involving the skin and mucous membrane of the anus. The appetite and digestion at this time remained good. The child was fretful and irritable, slept interruptedly, and held the right leg rather rigid, flexed and slightly abducted. Active motion of the leg caused the child to cry. Repeated cauterization of these anal fissures with the nitrate of silver stick having given no relief, a surgeon was called for counsel.

The child was anesthetized, and the surgeon expressed it as his opinion that the hip joint was free from disease, that the symptoms from which the child suffered were due to the anal fissures, and he proceeded to stretch the sphincter.

The operation soon gave relief from the blood-stained stools, from the painful defecation; yet the child did not im-

prove as was hoped for. The patient remained fretful. An occasional rise of temperature was recorded. The right leg remained abducted and painful, and the child resented all attempts to move the limb by prolonged crying.

One June 30, '95, in the child's twelfth month, the patient made the impression of being more acutely sick.

On examination the patient was emaciated, excessively pale, perspired a great deal; did not desire food; lay supinely on her back, the least movement caused her to cry with pain; Fontanelle only slightly open; no craniotabes. Visible mucous membranes anemic. The gums were spongy and swollen, with ulcerations at both angles of the mouth. These ulcers were half the size of a silver dime and covered by a grayish membrane which could be readily removed. About upper and lower incisors were several ecchymoses, each the size of a pea; they were of a purplish hue. On the tongue were aphthous ulcers. The pharynx was free. There was no glandular enlargement; the voice was husky.

The soft parts of the thorax were emaciated. The junction of bony with cartilaginous portion of ribs presented marked prominences. Auscultation and percussion at this examination negative.

The abdomen was tympanitic and protuberant. Spleen negative. Liver negative.

The epiphyses at the wrist were markedly enlarged. Petechial spots on both lower limbs. The lower limbs were swollen from the thighs down, swelling most marked in right leg, which was abducted. Great pain was experienced upon pressure of the limbs, or passive movement. Marked edema about both ankles; right arm swollen, painful and edematous.

July 6. Swelling and edema in lower limbs have increased. The little patient was unable to move her right arm. Passive motion of this member or pressure over it caused great pain.

The arm was edematous. The ulcers in the mouth were increased in size. A microscopical examination of a dried preparation of blood, stained with hematoxylin and eosin, and methyl blue preparations were made. Aside from a slight poikilocytosis nothing unusual was noticed.

Examination of urine revealed albumen distinctly present, also a few narrow hyaline casts. A distinct reaction for sugar was obtained by employing Fehling's and Nylander's test solutions. A quantitative test made by employing Fehling's solution, gave a half per cent. of sugar.

The respirations were accelerated, varying from fifty-four to sixty-eight per minute. The temperature followed an irregular course. The treatment at this time was largely dietetic, consisting of freshly expressed beef juice, orange juice, and fresh milk.

July 10. Urinary examination revealed presence of sugar, one-half per cent., and albumen. Swelling and pain in limbs not abated. Child inclined to nausea, and vomiting. Abdomen tympanitic. The frequent stool contained undigested articles of food and much mucus. They were offensive and of a greenish color. Ecchymoses on gums. Ulcers in mouth unimproved. Entertaining a fear that the continued use of unsterlized cow's milk was possibly the cause of digestive disturbances, the fresh milk of the goat was substituted. The pure goat milk did not agree with the child. This milk was next diluted one-half with sterlized water, and peptonized by using Fairchild's peptogenic milk powder. For the dyspepsia, calomel, bismuth and essence of pepsin were administered in appropriate doses. Camphor and nux vomica and alcoholic stimulation were administered to counteract, if possible, the rapid and irregular cardiac action ; cod-liver oil inunctions were employed.

July 15. The pain and swelling remain unchanged. The

dyspeptic symptoms continued. The child perspired a great deal. It was found necessary to discontinue the use of goat's milk entirely. Cow's milk was again employed. Orange juice, fresh beef juice and cod-liver oil inunctions were continued. All other medication stopped. Albuminuria and glycosuria unchanged.

July 25. Fresh cow's milk disagreed, and it was found necessary to discontinue its use. Egg albumen water was substituted. Dyspeptic symptoms continue to be the principal cause of anxiety. Scorbutic symptoms on the decline.

August 2. Gastro-intestinal symptoms have become intractable. Child vomited, retained absolutely no form of nourishment. Stools were frequent, contained much mucus and were offensive.

All forms of nourishment were stopped with exception of small quantities of egg albumen water frequently repeated, and alcoholic stimulation.

In order to nourish the child and combat the dyspeptic state which was threatening its life, also to supply a fresh food, to combat the scorbutic state, the services of a healthy wet nurse were secured, and the child fed with mother's milk from a nursing bottle. The patient did not take kindly to the mother's milk for the first three days of its use, though the stools rapidly improved, and the vomiting became decidedly less frequent.

August 10. Scorbutic symptoms have nearly disappeared, has taken twenty-six ounces of mother's milk for past twenty-four hours, relished it and was eager for its new food. The stools were much improved, child had not vomited.

August 11. Took thirty-two ounces of mother's milk, much improved, weighed thirteen pounds.

August 17. Continued to take mother's milk, as much as thirty-eight ounces in twenty-four hours. Ate a Graham

cracker daily, drank veal broth and fresh beef juice, weighed fifteen and a half pounds. Swelling of the extremities and pain entirely disappeared, she moved her limbs, raised her head, was bright. Rachitic condition remained.

The child continued the use of mother's milk till October, since which time has improved greatly in strength. On the first of November she began to walk, and has learned to speak a great many words.

A. R., Female child, age 12 months, was seen in September, 1896.

Patient had been sick during all of the summer with gastro-intestinal disorders. The child had been fed on sterilized milk, proprietary foods.

About the 18th of September, 1896, I saw the child for the first time. The child has been restless for about two weeks, it cries every time it is moved, both legs lie helpless as if paralyzed, the legs are swollen, the swelling reaching from the epiphyses to the knees.

The skin covering the affected areas is glossy; pressure over the swelling painful. No other bones affected—gums are swollen and bleed readily. The pulse was 120, temperature 100.8. Physical examination of the chest and abdomen negative, no signs of rickets, the urine is negative, stools are hard, child is constipated.

Treatment—The child was ordered fresh milk, properly diluted, one ounce of beef juice per day and, also, the juice of one orange daily. The child was kept under observation; for 10 days it made a steady and uninterrupted progress, and at this time has entirely recovered from the scorbutic condition.

I have seen a number of children in the last few years who showed some evidence of scurvy though usually not well marked and who recovered promptly after anti-scorbutic treatment was instituted. These were principally among children

who were fed on sterilized milk. These children were extremely restless, cried a great deal, suffered pain when pressure was applied over the long bones, and some had soft, spongy gums. They were undoubtedly incipient cases, and if they had not been influenced by treatment would probably have developed into the more severe type.

The glycosuria which occurred in the first case was not noted in any of the other reported cases. The glycosuria persisted for a number of days and caused genuine anxiety. If it proved to be a diabetes mellitus it had grave prognostic significance. The glycosuria was temporary and disappeared in the course of a short time.

ETIOLOGY.

Barlow observed that the poor children of London who live on bread and potatoes, and who are crowded in tenement houses which are poorly ventilated, remain remarkably free from this disease. According to an analysis of thirty-six cases by Northrup and Crandall, 36 per cent. were fed on proprietary food exclusively; 18 per cent. an exclusive diet of condensed milk or evaporated cream; two children received a diet of sterilized milk exclusively. In three cases a weak solution of milk and water. In only one case was fresh milk the exclusive diet. Thus we see the largest contingent of cases in this series were those who received proprietary foods.

Louis Starr (American Journal of Medical Sciences, Dec., 1895,) observed five cases who received sterilized milk. All recovered rapidly upon receiving fresh milk with the addition of a small quantity of raw beef juice and orange juice to the diet.

Northrup reports a fatal case in a nursing infant.

Cantani believes that a hunger for mineral salts, a partial inanition, is the cause. This opinion is shared by Garrod,

Buzzard, Ralfe and others. The deficiency of potassium bicarbonate and sodium phosphate in the nourishment decreases the resistance of tissues, gives also rise to an increased porosity of the vessel walls and interferes with the vital activity of the red blood corpuscles. This chain of conditions, according to Cantani, is cause sufficient for the development of scorbutus and hemorrhagic diathesis.

The disease affects mostly children during the last third of their first year, no cases having been observed before the fourth month nor after two and one-half years.

A variety of other opinions as to the cause of the disease exist.

Babes believes, from a bacteriological study of three cases, to have found a long, thin bacillus occurring in clusters in the gums. He believes that the bacillus is peculiar to the buccal cavity, but that under conditions of deteriorated general health the bacillus is excited into activity which is capable of producing the scorbutic gingivitis. He claims that inoculation produced characteristic mouth lesions.

Börtrager is of the opinion that scorbutus is a bacterial disease, and he isolated a coccus from the spleen of a person dead with this disease. He admits that the etiological importance of this micro-organism is not fully established. Baginsky says it would be difficult to conceive any other cause for this disease than a specific agent. Rehn reports a case and says that on a *priori* grounds he would have maintained that the disease was of an infectious nature, though bacteriological examination gave negative results.

These bacteriological examinations have not led us very far. In the light of our present knowledge, both clinical and experimental, we are justified in concluding that even if possibly one or more micro-organisms contribute to complete the clinical picture by acting locally in the mouth or in other or-

gans, the improper nutrition is an underlying and an effectual cause which has been observed in all cases and verified in a large majority.

V. Starck, Kiel, (Jahrbuch f. Kinderheilkunde, 1894) reports three cases of infantile scurvy which yielded, he claims, to antisyphilitic treatment, and suggests the possibility that that lues is a causal factor in the production of this disease.

A. Koppen (Jahrbuch f. Kinderheilkunde, 1897,) concludes that infantile scurvy has no necessary relation with rickets. He also believes that the nourishment only plays a part in the production of the disease in so far as the artificial foods are capable of producing a gastro-intestinal disorder or intoxication. Fermentation in the intestines and the production of toxic product leads to an auto-intoxication. He believes that the remedies that are employed do good because they relieve the constipation. He quotes a case of Freudenbergs where yeast was given at Baginsky's advice to relieve the fermentation and the case recovered.

On the basis of this intestinal sepsis the author explains the hemorrhage, the anæmia, the albuminuria, the small rapid pulse and the irregular temperature.

The occurrence of bronchitis and pneumonia are explained in the same manner.

Hirschsprung and Fuerst believe that the disease is a modified rickets.

SYMPTOMS.

The mode of onset is various. Most frequently the disease develops within a few days; the child desires to lie on its back; makes no unnecessary movements of its body; resists any attempt to touch or move his body; changing the napkin, bathing even in the most careful manner cause these little patients to cry pitifully as if in intense pain; or they observe the movements of their attendants with a look of anxiety

fearing lest they should be caused additional pain. This is the condition known as scorbutic cachexia. These symptoms may last a variable time, usually a number of days. No localized swelling is observed up to this time.

The changes present in connection with the long bones are of extreme importance because they occur most frequently and are the most characteristic for the affection in childhood. Swelling of the bone due to subperiosteal hemorrhage is the most important diagnostic sign of the disease.

A swelling may be observed over the diaphysis of the long bones; most frequently over the femur, tibia, less often the humerus or forearm; the process having once started may become bilateral or involve upper and lower extremities. The lower extremity which is most frequently involved is painful, helpless, or is flexed or abducted. Edema may be observed over the malleoli, over arms and eyelids. This condition may last unchanged for weeks, but in time tends to become less painful.

The gingivitis is not always present. As a rule it is absent in those children who have not yet cut their teeth. It may be absent in children who already have several teeth. At the points where the teeth have appeared the typical lesion occurs. The gums are swollen, spongy, are apt to bleed if touched, and are covered by ecchymoses of a purplish hue. Aphthous or ulcerative stomatitis may occur.

Hemorrhages may occur in the various organs and tissues of the body. Hemorrhage into the eyelids and under the skin has been observed. In Cassell's case a hemorrhage under the skin caused a tumor as large as an apple. Hemorrhages of the brain and meninges have been observed; into the orbit, causing exophthalmus; into the intestines, causing bloody stools; into the urinary tract, giving rise to hematuria.

The anemia is present in all these cases and is proportionate to the number of bones involved and the extent of the hemorrhages.

Fever is not always present; if present, is of an irregular or intermittent type. The cause of the fever in these cases, if we reject the specific nature of the disease, may be partly explained by the disordered alimentary tract or other complications.

Emil Reinert offers an explanation which commends itself. He believes the fever is such as commonly occurs with severe anemia. It occurs where a considerable disintegration of extravasated blood is going on, or where a resorption of such an extravasation is taking place. The pulse is soft, small and frequent. It is by this time a well-observed fact that the disease may occur without a sign of rachitis. Northrup and Crandall report eight cases where rachitis was entirely wanting. On the other hand, rachitis may have been present before the onset of the disease. It may occur simultaneously with the onset of the scorbutic condition, or may not appear until the scorbutic symptoms are on the decline. Barlow believes that rachitic children are most frequently attacked, or it may justly be maintained that both diseases are the result of improper nutrition and poor hygienic conditions and the same conditions which can cause a rachitis can sometimes cause an infantile scurvy.

The skin over the affected area is placed on the stretch and is glossy. Petechiæ may occur. In the first case reported in this paper a severe diffuse urticarial eruption on face and trunk was observed; it appeared and disappeared daily for a number of days. Fractures of the long bones have been observed. Detachment of the epiphyses is not altogether of infrequent occurrence. The appetite in these cases is very much diminished. The sleep is most often disturbed. Gas-

tro-intestinal diseases, bronchitis, pneumonia and a variety of other diseases are apt to occur as complications, and not infrequently are the causes of disastrous results to these already enfeebled patients.

PATHOLOGICAL ANATOMY.

From the original autopsies of Barlow and numerous others, among whom may be mentioned Northrup of our own country, we are indebted for our pathological knowledge of this disease. The extremities present the most constant pathological changes which are most commonly found in the thigh or leg. If one cuts down upon such an affected area, one finds that the musculature retains its normal contour and structure but is infiltrated by a serous or gelatinous substance. Occasionally an extravasation of blood may be seen which is located between or in the muscles. The periosteum which, under normal conditions is more vascular in the child than in adults, is swollen in this disease, thickened, stained with blood and over vascular. In an affected thigh, for example, the periosteum is raised from the shaft of the femur by a more or less complete sheath of blood clot. The coagulum is of a dark, grumous appearance. The shaft of the bone most frequently under these circumstances appears thinner; indeed the shaft tends to atrophy, owing to its being deprived to some extent of its nutrient supply. It is clear how in these thin bones a slight degree of violence can produce a fracture.

The above changes may occur in the tibia; they occur less frequently in the bones of the upper extremity. Barlow and MacKenzie observed similar changes in the ribs. Barlow also found the scapula the seat of a periosteal hemorrhage. In rare cases the bone of the cranium, the superior maxilla and crest of the ilium have been involved.

Detachment of the epiphyses is of frequent occurrence. The joints remain nearly always free from hemorrhage.

Hæmatoma of the dura mater and hemorrhage into brain have been recorded. The solitary follicles of the intestine have been the seat of hemorrhagic infiltration. In the pyramid of the kidneys slight hemorrhages have been demonstrated. Liver and spleen are normal, or at the most show a slight fatty change. The lungs may be the seat of hemmorrhagic infarct. Retinal hemorrhages are of extremely seldom occurrence.

DIAGNOSIS.

In well marked cases the diagnosis is not difficult. Great pain and tenderness of one or both lower limbs; swelling of the thighs; unrest; pseudo-paralysis; sometimes edema; the characteristic changes in the gums; such a classical array of symptoms make the diagnosis clear. But it is not always so easy. Visible hemorrhages are frequently absent. In toothless children, the gingivitis is often absent, or the prodromal symptoms may be prolonged, and no inconsiderable time may elapse before the characteristic symptoms develope. The fact that children improve if placed upon an anti-scorbutic diet is not an unimportant diagnostic factor.

Differential Diagnosis. Congenital syphilis can be excluded by the history of the case, by the absence of syphilitic lesions on skin and mucous membranes. In congenital syphilis we never have the history of such severe pain. The pseudo-paralysis of syphilis are limited nearly always to the upper extremities, the swelling is never so intense as in these cases of infantile scurvy, and is more prone to occur on epiphyses than on diaphyses. Separation of the epiphyses occurs in both diseases. In differentiating from acute rheumatism we recall that in rheumatism the epiphysis is affected while the diaphysis remains free, there is always a pronounced local heat and redness in rheumatic inflammation and always more hyperpyrexia

A spinal paralysis might be thought of, though in such cases there is no tenderness, no swelling. An osteo-myelitis

or periostitis occurring alone or in combination are possibilities which might suggest themselves in a given case. These diseases, however, occur seldom, run a rapid and pernicious course, with excessive high fever and chills, frequently with suppuration and necrosis, and may end fatally. The general impression that one receives from such a patient is of a more severely acute febrile type than occurs in infantile scurvy.

In a case of infantile scurvy, seen early before the swelling of the lower limb had occurred, the possibility of a hip joint disease might suggest itself. We know that the early age at which infantile scurvy most frequently occurs hip joint disease is very rare, though no age is exempt. Diffuse pain, abduction or slight flexion of the limb, the occurrence of acute pains at night, sufficient to awaken the patient with a sharp cry, would lead one to inquire into the condition of the hip joint. If the hip joint be manipulated the muscular rigidity and degree of motion will put one on the right track; the progress of the case, if infantile scurvy, will develope a train of symptoms which will make the diagnosis clear.

PROGNOSIS.

If the disease be recognized sufficiently early and proper treatment instituted the prognosis is fairly good.

Fürst collected 166 cases, of which 111 recovered, 67 per cent.; 31, or 18 per cent., died, and in 24, 15 per cent., the course and result remained unknown. Severe hemorrhage, causing excessive anemia, darkens the prognosis. Complications on the part of the digestive or respiratory tract add additional danger to the life of the patient.

TREATMENT.

Brilliant results are obtained in these cases by providing a suitable diet. Fresh cow's milk, or mother's milk, beef juice, orange or lemon juice, fresh vegetables, mashed potatoes are recommended by Cheadle, are the most suitable

articles of diet. The child should be brought under the best possible hygienic conditions, good ventilation should be provided for and under favorable conditions of weather the child should be out of doors. In the severer cases, where a state of collapse exists or the pulse is very rapid and irregular, alcoholic stimulation should be given. Cod liver oil by mouth or inunction is especially indicated when the child recovers from the scorbutic condion, to aid nutrition. Iron should be administered in cases where atrophy or anemia persist.

Vomiting, constipation, dyspepsia, diarrhœa must be treated by adapting the diet as nearly as is possible to the age and condition of the patient and by the use of appropriate drugs; small doses of calomel, mercury and chalk, pepsin or bismuth may be used as is indicated. Care should be taken to overcome the constipation which is frequently present.

For the swollen and bleeding gums a mild antiseptic and astringent solution is grateful to the patient.

Care should be exercised in handling these children; owing to the fragility of the bones fractures occur readily. These infants should be preferably kept on a pillow or cushion on which the child can be picked up or carried about.

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DISCUSSION.

DR. ELIZA H. ROOT, Chicago: The question of home modification of milk is one of very great importance to us as physicians, because all kinds of troubles may occur in infants from impure or improperly prepared milk.

I concur with almost everything Dr. Abt has said with reference to the treatment of infantile scurvy. In the treatment of infantile diseases there is one important point to be borne in mind, namely, that the treatment which is suitable or applicable for one child cannot be applied to another. Each child must be studied individually and treated accordingly.

DR. JAMES B. HERRICK, Chicago: I was a little surprised to hear Dr. Norbury say that in cases of malnutrition in infants cod-liver oil was practically contraindicated. Personally, and from practical experience, I have found cod-liver oil by inunction and by the mouth of great practical value in cases of malnutrition in infants.

I have listened with great interest to the paper of Dr. Abt, and I think he has done great service in calling our attention to the existence in our cities of infantile scurvy. I have seen but one case to recognize it, and in that case there were certainly suspicious evidences of pre-existing rickets. The rachitic rosary was well marked; there was enlargement of the ends of the bones about the wrist. One other interesting feature in that case was that the child suffered a great deal when the bowels moved, and presented some of the evidences described by Dr. Abt. Also a suspicious swelling developed in the peritoneum, and I thought at first that an abcess had formed, but on opening it, it was found to be a small collection of blood, due I suppose to the hemorrhagic tendency. There was great restlessness, screaming at night, pain, disturbance of the stomach, swelling of the lower extremities, with excessive pain and tenderness. In other respects the case was typical and improved and finally recovered upon instituting anti-scorbutic treatment.

DR. T. J. PITNER, Jacksonville: I have listened with a good deal of interest to the presentation of this subject of infantile diseases and malnutrition. From a practical standpoint, we cannot emphasize its importance too much. I hope we may be better able to assist our patrons in an understanding of the subject and the practical handling of it, and perhaps in no way can we be more useful to our patrons than to give them practical directions for the feeding of infants. We have all seen the disposition or tendency on the part of mothers to resort to ready-made products which are brought to their notice in obvious ways. They take them because it is the best knowledge they

have on the subject and resort to their use to remedy the troubles in children. These products prove deceptive in the majority of cases, as we all know. When we come to tell mothers to provide the necessary apparatus for the purpose of sterilizing milk or of pasteurizing it, we find that they can more readily sterilize it than pasteurize it. I have found but few families who were provided with a thermometer, or with a means of testing the temperature in heating the milk. I am satisfied from my own observation that the moderate heat, as prescribed in one of the papers, of 160 to 170 F., is much better adapted in the majority of cases for infants than sterilizers. It will answer the purpose of destroying the ordinary germs that exist in the milk, leaving it more in a natural state, so that it can be readily taken and appropriated.

It is the province of the physician to give suitable directions, to urge upon the parents to procure suitable apparatus for home treatment and the adaptation to particular cases. A great many infants are brought up nowadays on artificial food, hence the matter of prevention of diseases is a very important matter, and I am glad to say it is receiving its merited attention at the hands of the profession.

Dr. Frank P. Norbury, Jacksonville (closing the discussion on his part): I have very little to say except to answer a remark made by Dr. Herrick relative to the use of cod-liver oil, which I spoke of being contraindicated in some cases. I find from experience, as well as from my reading in the matter, that cod-liver oil is not of very great value in cases of malnutrition of dietetic origin, but in ordinary, simple cases it may be used with satisfaction. But in the simple cases of malnutrition resulting from errors of diet, we are liable to have fat intoxication, and my experience has been that the use of cod-liver oil under such circumstances intensifies the condition. In one case, in which there was an excess of fat, a good deal of disturbance was engendered, and the case gave me a great deal of concern, and not until I had exhausted all my resources and the resources of literature did I write to Dr. Holt, who replied to my letter, stating that I had a case of fat intoxication; that I was using an excess of fat, and recommended a similar percentage of cream. I told him I was using cod-liver oil and he recommended its discontinuance. The case was that of my own child. After the discontinuance of cod-liver oil there was marked improvement. It was a case of simple malnutrition, and not due to any dietetic conditions whatever. I have seen a similar condition in one other case in which convulsions were a factor. Cod-liver oil had been used (I believe Scott's Emulsion), and it only intensified the condition. By using a smaller per cent. of fat and gradually working up the

development of the child, it is possible after a time to use cod-liver oil, but in the very inception of the case it seems to me it is not indicated.

Dr. Frank S. Churchill, Chicago, (closing the discussion on his part): Dr. Norbury's observation is extremely interesting, and in individual cases undoubtedly fat intoxication will arise; but in the great majority of cases we have to do with errors of nutrition. The analyses of Professor Chittenden, of Yale, are interesting. He has analyzed most of the proprietary foods and finds, for instance, that malted milk contains 6-10 of 1 per cent. of fat, instead of 4 per cent., which is the standard for human milk. It must be our standard, and in infant feeding we must approach that as nearly as possible. Nestle's Milk contains 3-10 of 1 per cent. of fat; Imperial Granum 1½ per cent. of fat; Mellin's Food ¼ per cent of fat.

In the great majority of instances of malnutrition that we run across they are the result of fat starvation, and in individual cases fat intoxication will occur. As I stated in my paper, the individual case must be thoroughly studied.

With regard to the use of a thermometer, I find it is an impossibility for the extremely ignorant people to master its use. Some families are so poor that they cannot afford to purchase them, and in many instances the milk is not heated at the temperature it should be.

Dr. Abt (closing the discussion): I wish to refer to one point made by Dr. Churchill which I think has not been sufficiently emphasized. It is as important as sterilization, and I refer to the impotance of knowing the source of the milk. We should know whether or not the dairy has been kept clean; we should know whether or not the individuals who have the cows in charge and the milkers are clean or not. It seems to me all of these people should take some antiseptic precautions, and it is very essential that the milk sent to various homes is clean and fresh, so that only a small amount of pasteurization or sterilization is necessary.

Another point is with reference to the Arnold sterilizer thermometer. I frequently find that I can maintain the temperature at or about 160 to 170 F. by merely leaving the hood of the Arnold sterilizer off, allowing the water in the sterilizer to come to a boiling point and letting the milk remain in the sterilizer for about ten minutes. With the hood off the sterilizer is at a temperature of 160 to 170 F.

With reference to Dr. Norbury's paper, I merely wish to make a plea for a classification of the gastro-intestinal diseases of childhood. I think we speak of them indiscriminately. While it is true that a bacteriological classification cannot be made, nevertheless an anatomical and symptomatological classification can be, and I think it is im-

portant both from the standpoints of diagnosis and treatment. It is very essential in teaching these diseases that some definite classification should be made. They should be classified as acute and chronic disorders; they should be classified according as they involve the stomach and give rise to indigestion or dyspepsia, or whether they give rise to gastro-enteric catarrh, or to follicular enteritis, or, on the other hand, to that most acute and fatal of all diseases—cholera infantum.

I wish to call attention to the treatment of these diseases by lavage. It is excellent treatment, and we should also wash out the bowel with the addition of a small amount of tannic acid.

SOME POINTS CONCERNING THE DIAGNOSIS OF PLEURISY WITH EFFUSION, WITH PARTICULAR REFERENCE TO MISLEADING PHYSICAL SIGNS.

BY JAMES B. HERRICK, M. D., CHICAGO.

The object of this paper is not so much to record new observations or to repeat the well-recognized and generally accepted facts concerning the diagnosis of pleurisy with effusion, as it is to emphasize points that are apt to be overlooked, to refer to some that are easily misinterpreted, and to dwell more upon the atypical cases and the anomalous physical findings.

As in the case of other diseases, the diagnosis of pleurisy with effusion is reached by, *a.* The subjective history, *anamnesis*; *b.* The physical examination, *status præseus.*

Anamnesis. The typical history of slight chill or chilliness, pain in the chest aggravated by thoracic, and especially by inspiratory movements, dry cough, fever and malaise, is always suggestive of pleurisy. And if coupled with this is the statement that after a few days of pain there followed a period of improvement, with relief from suffering, this period being succeeded by a gradual sense of oppression, dyspnœa, difficulty in lying upon the sound side, sweats and feeling of weakness, one is almost justified in assuming a fibrinous pleurisy, with a later fluid exudate.

In connection with the history, I wish to refer to but three facts:

1. The previous history may throw much light upon the possible existence and probable origin of many cases. A local

trauma, a preceding pneumonia, or acute articular rheumatism, an existing pyæmic condition, may furnish the etiologic factor. And careful inquiry as to family or individual tuberculous taint—family deaths from tuberculous disease, preceding pleurisies, recurring attacks of bronchitis, symptoms indicative of genito-urinary or articular tuberculosis, should be made. For the trend of modern experimental, anatomical and clinical investigation is to make out a majority of cases of non-suppurative pleurisy with effusion as of tuberculous origin. So, too, when the physical examination has been reached, search should be made for apical pulmonary deposits, for nodules in the epididymis, for scars indicating old bone trouble as possible indications of the existence of tuberculosis elsewhere, throwing light on the origin of the pleural affections.

2. The onset is often very insidious and without pain or cough. These cases may readily be mistaken for mild typhoid fever. There are the same vague pains, headache, chilliness and anorexia. The fever may be remittent and resemble that of a light typhoid. It is only by the absence of the more positive typhoid signs—the spleen, spots, tympany, slow pulse, Widal reaction, etc.—and by the physical examination of the base of the chest that the small effusion is found that gives a clew to the trouble. This mistake is, I believe, made oftener than is generally supposed.

3. In another group of cases the onset is so explosive as to suggest a pneumonia. The chill may be quite marked and the temperature high, even with serous effusions. The physical examination clears up the diagnosis. It is in some of these cases with massive, serous effusions, high temperature and marked constitutional symptoms, that recurrences are met with after repeated tappings, and that retraction of the affected side is more apt to be excessive. Many of these cases are tuberculous.

PHYSICAL EXAMINATION.

Inspection. The pale, yet cyanotic, dyspnœic individual with bulging intercostal spaces and nearly motionless affected side upon which he prefers to lie, presents to the trained eye a picture highly suggestive of pleural effusion. Of great importance in the diagnosis is the displacement of the heart's apex-impulse. In left-sided effusions particularly, will it be pushed far to the right, a valuable point when endeavoring to differentiate between consolidation and effusion.

With effusions, the diaphragm phenomenon of Litten (1) becomes obscure or absent. In a normal chest and in a favorable light, the diaphragmatic excursion should be plainly made out. With effusion it is depressed and limited in excursion or wholly invisible.

With moderate effusions the upper chest may have considerable freedom of motion. Even with much fluid in the chest there may be inspiratory recession of interspaces. And not infrequently patients will lie with equal comfort upon the sound or the affected side, though, as a rule, with large effusion the decubitus is by preference on the affected side.

Pulsation of the chest wall may occur particularly with circumscribed left-sided purulent effusions, though this phenomenon has been noted with serous fluid and rarely on the right side.

Palpation as a means of diagnosis of pleural effusions may confirm the results of inspection as to loss of motion, prominence of interspaces, location of apex-beat, of liver margin and of spleen. The spleen, however, even with large left-sided effusions, is rarely palpable unless it be itself enlarged.

With fluid there is commonly a loss of vocal fremitus. In certain cases, where there are marked differences between the two sides, variations in tactile fremitus may be highly sig-

(1) Litten—Wiener Klin. Wochenschrift, 1895.

nificant. But with small amounts of fluid, with a voice loud and low pitched, with pleural adhesive bands, with a chest wall well capable of conducting the sound waves, as is so often found in children, tactile fremitus may be well preserved, and unless one is cautious and does not overestimate this method of examination, one can readily mistake a moderate collection of fluid with compressed lung for pulmonary consolidation, particularly when, as is so often the case, there is also pronounced bronchial breathing. Even with large effusions, fremitus may be well-preserved in the inter-scapular region. And even with consolidation a plugged bronchus or an œdema of the chest wall may interfere with fremitus, thus misleading one in the other direction. Personally I regard tactile fremitus as a sign of minor value, though some regard it as of fully as much importance as percussion. By means of vocal fremitus it is as a rule possible to define very accurately the upper limit of the fluid. It is more accurate than percussion, because the compressed and airless lung above the fluid also gives a dull sound. (1)

Fluctuation is seldom made out. Occassionally œdema of the chest wall on the affected side is observed.

The value of palpatory exploratory puncture and of the sense of resistance will be referred to later.

Percussion over fluid gives dullness, varying according to the thickness of the layer, from slight relative dullness to absolute flatness. Where the amount of fluid is large little is to be learned from noting the outline of the upper border of this dullness. But with moderate effusions this is of great importance.

With small and moderate amounts of fluid the flatness reaches a higher level in the axillary line than in front or behind. But relative or slight dullness often reaches a higher

(1) Gibson and Russell—Physical Diagnosis. 2nd Ed. p. 171.

level behind and close to the spinal column than in the axillary space. This leaves posteriorly a triangle of relative dullness, whose lower border is the line of flatness running from the axilla downwards to the spinal column, its inner border the spinal column and its upper border the line running from the point on the vertebral column marking the highest limit of relative dullness downward and outward until it meets the line of flatness in the axillary space. This triangular space in pneumonia of the lower lobe is flat, in pleural effusion dull. Even with large effusions, an area of relative dullness can often be found bordering the vetebral column. By making this distinction between relative dullness and flatness, the conflicting statements regarding the direction in which the line of dullness runs from the axillary space to the spinal column are reconciled. For if we speak of relative dullness the line runs from the mid-axilla upwards to the spinal column; if we speak of absolute dullness it runs downward.

It is important to remember also that the dullness in this triangle just referred to *gradually* increases from above downward, a finding that argues in favor of fluid and against consolidation. When we consider that the outline of dullness posteriorly corresponds in so many cases to the outline of the lower lobe and that over this dullness, particularly its upper and vertebral position, bronchial breathing is frequently heard, we can readily understand how mistakes can occur in differentiating between lower lobe pneumonia and pleural effusion.

At the upper limit of the fluid various modifications of the normal resonance are met with. The Skodaic note is common and Williams' tracheal tone may at times be elicited. A cracked-pot sound is occasionally met with.

Of immense value is the sense of resistance. This sensation, impossible accurately to describe, communicated by combined palpation and percussion, is imparted to the fingers

used as plexor and pleximeter when fluid is underlying. Even a deaf man can tell by percussing three bladders filled respectively with air, water and a solid, which one contains the air, and probably also, by the peculiar elastic resistant feel, which one contains the fluid. An abdomen filled with gas or with a solid mass imparts a different sensation to the percussing fingers from that imparted by an ascitic abdomen. The same difference is met with in the case of fluid in the chest, and one is justified in saying, "it feels like fluid," and in attaching much importance to the sense of resistance. This sign becomes of greater and greater value to the physician the more experience he has in chest examinations, and in certain cases outweighs all the other methods.

With small effusions the signs will be best marked just below and external to the angle of the scapula in the posterior axillary line. Here a relative dullness, the sense of resistance and enfeebled respiratory sounds can often be made out when signs elsewhere are absent or uncertain. It is a situation always to be carefully examined in doubtful cases before excluding fluid. On the right side sometimes early signs suggestive of fluid are found close to the sternum just above the liver.

For the detection of small effusions Gerhardt advises that the lower limit of the lung be marked out with the patient in the erect posture. Then with the patient leaning forward, or even on the hands and knees, examination of the mid-axilla should be made. A small amount of fluid is usually freely movable enough to shift its position under these circumstances and cause dullness to appear above the line indicating the lower lung resonance of the erect posture.

In left-sided effusions much importance is attached to the findings in Traube's semi-lunar space, the resonant area lying between the dullness of the left lobe of the liver and of the spleen and bounded below by the left costal margin. As fluid

collects it gradually fills the pleural sinus and pushes forward, its advance marked by a line of dullness running nearly parallel with the costal margin until the entire space may be dull or flat, though often the deep tympanitic resonance of the stomach may be detected through the thin layer of the overlying fluid.

While the examination for dullness in Traube's space should always be made, certain precautions are necessary. Undue enlargement of the liver, spleen or heart, or over distension of the pericardial sac with fluid, or overfilling of the stomach with solids or fluids may modify its outlines and the percussion note. And again, pleural adhesions may prevent the filling of the complementary pleural space even though fluid may be present in considerable quantity. And in not a few cases, even though no adhesions could be demonstrated, I have found the space resonant, though a goodly amount of fluid was demonstrated in the left chest by other signs, including exploratory puncture.

It is always a valuable sign of fluid when there can be noted a change in the level of the line of dullness with a change in the position of the patient. This cannot always be detected, however, even after the patient has remained for some time in the changed attitude. Leube (1) regards the free movement of the fluid in the pleural cavity as arguing in favor of a transudate—an hydrothorax.

Auscultation. There are so many exceptions to the rule that with pleurisy with effusion there is an enfeeblement of the respiratory sounds that unless one is on guard one may fall into serious errors of diagnosis. The truth is more nearly stated if we assert that with pleural effusion the *vesicular murmur* is enfeebled or lost. This is generally true even of slight effusions, where a feeble vesicular breath sound, or none at all, may be heard. As the amount of fluid increases and

(1) Leube—Diagnose der Inneren Krankheiten, I. p. 160.

compression of the lung is more marked, the vesicular tone is replaced by the harsher bronchial breathing. This may be distant in character, but it is often quite distinct and loud, particularly in children, or where adhesions hold the compressed lung close to the chest wall. Posteriorly, in the interscapular region, where there is a moderate effusion, the gradual gradation from the normal vesicular sounds above to broncho-vesicular, bronchial, distant bronchial and enfeebled or lost respiratory sound can often be plainly made out, though it is not possible always to map out clearly the different zones of bronchial-vesicular, bronchial and absent respiratory sounds as one might judge from reading some descriptions, *e. g.*, Rosenbach's. (1) I think it will be found generally true that even with small-sized collections of the fluid the breath sounds are feeble in the posterior axillary line below the angle of the scapula.

The transmission of voice sounds, commonly interfered with by fluid, may be favored by adhesion or by the location of a compressed lung close to the chest wall. The chest wall itself, particularly in children, may prove a good sounding board. But occasionally the reasons why sounds are so clearly transmitted are by no means evident.

The whispered voice is often heard with remarkable distinctness with non-purulent collections of fluid, though this sign is not, as Baccelli contended, confined to serous fluid, but may be present with pus or with pulmonary consolidation.

Lænnec (2) laid great stress upon the presence of the tremulous nasal voice sound at the upper limit of the fluid, the sound resembling the bleating of a goat, hence his term ægophony. This sound was in Lænnec's time, so he tells us, often confounded with bronchophony, a mistake which the discoverer of auscultation regarded as serious. Comparatively little

(1) Rosenbach—Nothnagels Specielle Pathologie und Therapie, Bd. XIV.
(2) Lænnec—A Treatise on the Diseases of the Chest and on Mediate Auscultation. Forbes' Translation p. 40-49. N. Y. 1830.

stress is to-day laid upon ægophony as a means of diagnosing pleural fluid and upon its differentiation from bronchophony; but I think that the more it is sought for and distinguished from bronchophony, the oftener it will be heard and the more valuable it will appear to be.

The presence of rales, as in a compressed lung or underlying consolidation, does not disprove the presence of fluid. For they are sometimes heard quite as distinctly as bronchial breathing. A friction sound can sometimes be heard near the upper limit of the effusion.

The crucial test is the exploratory puncture. With careful sterilization of the operator's hands, the field of operation and the instrument—*i. e.*, the needle, by boiling—the danger of infection is practically nil. And with application of anatomical knowledge, the risk from puncture of important vessels, the heart, liver, spleen, etc., is a minimum one. Practically, too, punctures with a fine needle of the lung, liver, spleen—possibly even the pericardium and the heart—are seldom of serious consequence. By means of the puncture the existence of fluid and its nature are determined. Negative results should not be too quickly accepted as disproving fluid. Fluid may be missed because it is encapsulated by adhesion, because it is too thick to flow through a fine needle, because a fibrinous plug blocks the needle or because the chest wall is unusually thick from a fibrinous pleural deposit or from muscle and fat so that the needle, though pushed into what seems a proper depth, in reality does not penetrate the chest wall. If the needle is pushed through at too oblique an angle, it runs along in the chest wall for a considerable distance without perforation of the pleura. From the depth to which the needle is buried one can readily assume that it must be in the pleural cavity. This error is avoided by making the puncture more nearly at right angles to the chest wall. In some cases the absence of fluid is only to be regarded as proven as the result of several negative punctures.

The sensation imparted to the hand guiding the needle is worthy of note. This "palpatory puncture" (Rosenbach) enables us to judge somewhat of the thickness and density of the pleural lining, to determine somewhat as to the mobility of the lung or the diaphragm, if the needle point is in contact with either of these, and to judge whether or not the needle penetrates a cavity containing fluid or whether it enters a solid tumor. The peculiar cartilaginous resistance of the dense fibrous plates that sometimes line the pleural cavity after pleuritis is *sui generis*, and is readily recognized a second time after a single experience in trying to get through the chest wall to explore the underlying fluids.

And by exploratory puncture a microscopic and bacteriologic examination of the fluid is possible, a point not necessary to elaborate in this paper. Yet the statement may be here permitted that the examination by coverslips, culture and inoculation is often of great service in giving us clear views as to etiology, prognosis and treatment. Negative bacteriologic examinations are to be viewed as hinting strongly at tuberculosis. And it is to be remembered that the upper layers of fluid may to the naked eye appear less like pus than the lower, so that in doubtful cases it may be well to make punctures at different levels, in order to determine accurately the character of the effusion.

This brief description given of the method of diagnosis of pleurisy with effusion has aimed to call attention to certain facts that are misleading rather than to dwell upon those that correspond with the oft described findings in the typical case. For it is often harder to forget than to acquire, hard to unlearn the lesson of the typical case of the text book, the didactic lecture, the amphitheatre clinic and of the first year's cases in private practice, and to realize that so many exceptional conditions arise that only rarely do we

meet with cases answering in every particular the notions of our student days. The more one sees of hospital work controlled by autopsy the more one becomes convinced that it is a common mistake to overlook small amounts of fluid in the pleural cavity, a mistake that is often of serious nature when the fluid is purulent or when both cavities are involved, or when diseased conditions in other organs, as heart, kidneys or liver, render the presence of even a small amount of pleural fluid a not insignificant burden to carry. I have aimed to show the importance of remembering that even with effusions of some size there may be such misleading phenomena as inspiratory retraction of the interspaces, decubitus on the sound side, retained vocal fremitus and transmission of voice sounds, bronchial breathing, even fairly good resonance in places, an unaltered Traube's space, even negative results from exploratory puncture. And I have striven to show the importance not alone of remembering these facts but also of careful examination in certain places for slight effusions, particularly the extreme base of the lung, and especially in the posterior axillary line just below the scapular angle.

The time limit renders it impossible to consider more fully the diagnosis from a differential standpoint and to show in what way pleurisy with effusion is to be distinguished from pneumonia, abscess of the liver, phrenic abscess, intra-thoracic tumors, aneurism, etc., or to consider the difficulties arising when we have pleural effusion as a complication of other thoracic diseases, as tumor of the lung, pulmonary tuberculosis, aneurism, pericarditis with effusion, the latter condition, by the way, simulating in many cases almost perfectly left-sided effusion, nor to consider the various localized pleurisies, the diaphragmatic, sacculated, interlobar, or the importance of distinguishing the serous from the purulent forms.

DISCUSSION.

DR. B. W. SIPPY, Chicago: *Mr. President.*—I heartily agree with all Dr. Herrick has said in his paper with reference to the diagnosis of pleurisy with effusion, and I would simply emphasize one point that was made, the use of aspiratory puncture in the differential diagnosis of these cases. As Dr. Herrick stated, it is a crucial test. I wish to call attention to the fact that while it is invaluable in diagnosis, under certain circumstances it may possibly give rise to error. At our post-mortem examinations we find that when cases die of pneumonia we have an effusion into the pleural cavity, which may be circumscribed. Obviously, in those cases it would be a grave error to conclude simply from the fact of withdrawing fluid from the pleural cavity that the clinical picture was explained on the ground of the pleural effusion. Possibly the use of the aspirator in withdrawing large quantities of fluid would appear difficult in some cases. Not infrequently in many cases we have dullness, with a little fluid outside of the infiltrated area, and its withdrawal would lead to great improvement.

DR. J. L. MILLER, Chicago: There is nothing in particular that I can add, except to allude to one or two points mentioned by Dr. Herrick in his paper. In the first place, the ordinary signs as given in our text books on this subject are frequently misleading, and post-mortem examinations do not harmonize with the results of physical examinations. In speaking of the use of the hypodermic needle, I will mention one case as showing that there is a possible source of danger connected with its use. In the patient in whom I saw the hypodermic needle used the puncture was made too low, and a few days after the patient died. A post-mortem examination was held and showed that the needle had penetrated the spleen. Apparently the patient had taken a deep inspiration at the time the puncture was made, and there was found a cut in the capsule of the spleen of perhaps an inch and a half where the needle penetrated. Of course, this danger can be obviated if the puncture is made at the proper point. In this particular case the puncture was followed by considerable hemorrhage, which undoubtedly led to the death of the patient.

DR. ARTHUR R. EDWARDS, Chicago: There are several points in connection with Dr. Herrick's paper that are of special interest. Most of us agree with him that the atypical findings of pleurisy with effusion are really more frequently observed than the typical. One of the first points that interested me is the fact that on the side in which pleurisy with effusion occurs we may have the chest smaller than on the other side, possibly due to the vicarious distention of the other lung. At any rate, very frequently we see the chest retracted upon

the side where the effusion takes place, so that on inspection we think less of effusion and possibly of some other change in the pleural cavity.

Another point of importance is the fact that in certain cases two affections may co-exist, namely, consolidation and effusion. A typical instance of this statement is the occurrence, or the sequence, rather, of pneumonia and pleurisy, as, for example, a pneumococcus empyema which may follow a lobar pneumonia. Dr. Herrick brought out a very essential point, namely, that vocal fremitus may be increased over the seat of effusion, and this may be due not only to adhesions, but, as in a case recently observed, the effusion may so compress the lung as to drive it entirely from the chest wall. The anterior and lateral portions of the chest flatten out against the spinal column, and through a number of inches of fluid we have distinct bronchial breathing; in other words, all of the signs of consolidation, even where we cannot satisfactorily explain the physical signs. Of course, these errors are to be avoided by puncture for diagnostic purposes, as Dr. Herrick has suggested, and the examination of all parts of the lung.

Another point in connection with the paper is the direction which the needle should take, and I would like to add one thing to what he has stated, namely, that the direction of the puncture is not without importance, especially where we puncture in the lower portion of the pleural cavity, puncturing at right angles to the chest wall will obtain serous fluid. We also have contradictory experiences in making punctures, especially where we attempt in any way to follow the rules laid down for puncturing in cases of pleurisy with effusion. We are often told by certain clinicians and by most of the text books that puncture is best effected in this area or that interspace, in such and such locality. I think such rules should be abandoned, and that we should seek fluid where the physical signs lead us to think the fluid exists. We must be governed entirely by the physical signs.

In pleurisy with effusion, we should always remember that pleurisy may be merely a sequence of another lesion; it may be covered up by an aneurism, or an abscess beneath the diaphragm, or by trouble in the lung itself.

The various points brought out by Dr. Herrick are timely, because they are usually disregarded in the diagnosis of effusions in the pleural cavity.

Dr. Herrick (closing the discussion): Possibly I read my paper too rapidly, and consequently some of the points were misunderstood If I was understood as saying that the aspiration of fluid from the chest by puncture meant that we had a pleurisy with effusion, pure

and simple, I wish to correct that impression. I tried in the closing paragraph to intimate that I recognized fully that the aspiration of fluid merely proves that there is fluid in the chest, and that it does not prove at all there may not be some underlying disease. We may have a tumor of the lung ; we may have abscess of the lung ; there may be a pneumonia, and I agree fully with what Dr. Sippy said, that we may obtain fluid from the chest and still there may be pneumonia. Puncture shows that we have fluid in the chest, but it does not, of course, prove how much fluid there is, nor does it prove that there is not some underlying disease. Puncture should be made intelligently and with certain restrictions.

I agree fully with Dr. Edwards that there should be no routine rule as to the point of puncture, and that we must seek the fluid where it is. That has been impressed upon me particularly in the case of interlobar pleurisy where the clinical history was that of pleurisy, and the physical findings were those of fluid, but where it took two or three punctures to locate the fluid accurately. In this particular case the fluid was found between the two lobes of the left lung, and it had to be sought with the arm of the patient thrown well across to the opposite shoulder, close under the vertical border of the scapula. If we had made puncture at the ordinary points laid down in our text-books, we would have missed the fluid. But going higher up we obtained a purulent fluid, so that we had to be guided not by any rule, but by the physical signs, and look for the fluid where the physical signs indicate that it is.

THE SMEGMA BACILLUS.

BY J. L. MILLER, B. S. M. D., CHICAGO.

With the advance of our knowledge of bacteria and their relationship to the causation of disease, there is a growing tendency to rely on the bacterial findings for the absolute diagnosis of certain disease processes. Diphtheria, gonorrhœa and tuberculosis are common infections in which we scarcely consider our diagnosis absolute unless the specific micro-organisms can be demonstrated. In none of the bacterial diseases has the microscopic diagnosis reached such perfection and is so free from error as in tuberculosis. Here however errors in diagnosis have been made, important organs have been removed, based on the supposed microscopical demonstration of tubercle bacilli, and found to be entirely free from tubercular lesions.

We are aware at the present time that there are several bacteria that possess, to a greater or less degree staining and decolorizing properties similar to the tubercle bacillus. It is one of the members of this group which forms the subject for our discussion.

Many explanations have been offered as to the probable cause of the resistance to stains and decolorization of the tubercle bacillus and allied micro-organisms. Matterstock (1) suggests it is a combination of the protoplasm with fatty acids. We know that crystals of fatty acids possess tinctorial qualities resembling the tubercle bacillus and indeed may be a source of error in diagnosis. Others maintain it is fat in the

protoplasm or in the cell membrane. When treated with certain solvents of fats this group of bacteria lose their peculiar staining qualities. Bienstock (2) cultivated various pathogenic micro-organisms in 20 per cent. butter agar and found that when grown in this media they all showed marked resistance to decolorization by acids. Some of the micro-organisms tested in this manner were the bacillus typhosus, spirillum of Asiatic cholera, bacillus anthracis and bacillus pyocyaneus. He believes the staining qualities of bacteria are determined in a large measure by the media on which they are grown. Laser (3) and Czaplewski found that cultivating these micro-organisms, resembling the tubercle bacillus in staining qualities, on media free from fats, they still retained their resistance to decolorization.

It is essential that we have a knowledge of the distribution, morphology and especially the tinctorial qualities of this group of bacteria, and especially of the smegma bacillus, because of its general distribution over the surface of the body and its frequent presence in the urine, and also on account of its close resemblance to the tubercle bacillus in size, form and staining qualities.

Lustgarten (4) in 1884 reported the discovery of the supposed bacillus of syphilis. He demonstrated the presence of a micro-organism, possessing peculiar staining characteristics, in the primary, secondary and tertiary lesions of syphilis on various parts of the body. Many investigators immediately began a study of this field. It was soon determined that Lustgarten's bacillus was present not only in syphilitic lesions but also on certain parts of the body of healthy individuals. Because of its almost constant presence in the smegma, it was called the smegma bacillus. It is not within the scope of this paper to discuss the probable relation of Lustgarten's bacillus to syphilis. It only concerns us here inasmuch as it possesses

staining qualities similar to the smegma bacillus; for this reason in our study of this micro-organism we will not attempt to differentiate it from Lustgarten's bacillus.

Habitat of the Smegma Bacillus. Alvarez and Tavel (5) found the smegma bacillus in thirty-three out of fifty primary syphilitic lesions on various parts of the body, in two cases of herpes progenitalis, one of pemphigus and in ten out of fourteen preparations of smegma from the genitalia and anus of non-syphilitic individuals. Bitter (6) demonstrated it readily in numerous syphilitic lesions on various parts of the body, including lesions of the oral mucous membranes and ear. Bunge and Trantenroth (7) found it present in the deep urethra in one out of twelve cases; in the external urethra of healthy persons it was almost constantly present; in one case each of prostatic and peri-urethral abscesses it could not be demonstrated. They were found between the labia in twenty-eight out of thirty healthy women. They are usually present in the vagina and occasionally penetrate the cervical canal and external urethra. Urine from forty-seven healthy women was examined by Grünbaum (8), staining by Gabbet's method, and smegma bacilli found in twenty-eight. Catheterized specimens from eleven individuals were negative. Specimens obtained by allowing patient to pass part of urine, then withdrawing the remainder with a catheter and examining the specimens separately, showed that in two individuals both portions were negative; in the other two, urine passed in the natural manner contain the smegma bacillus; the catheterized specimens were negative. Bunge and Trantenroth demonstrated them in eleven specimens of urine, frequently finding them in clumps, thus still more resembling the tubercle bacillus. Catheterized specimens were always negative.

Morphology. The smegma bacillus is a pleomorphous bacterium *i. e.*, one capable of variations in form depending

on the conditions of growth. Several varieties more or less different have been described.

(*a*) Those most frequent in præputial smegma are slender rods two or three times as long as the tubercle bacillus, frequently curved or assuming the form of an S.

(*b*) Broad Condylomata and vulvar smegma contain a bacillus from one and one-half to six microns in length, about one-half as thick as the tubercle bacillus and frequently occuring in clumps in the urine. Spores were occasionally observed.

(*c*) Very short ovoid forms scarcely to be distinguished from a coccus. They are found either singly or in pairs and were highly resistant to decolorization.

Besides the above varieties there are many intermediate forms, straight and curved rods of various sizes, one form described closely resembling the comma bacillus. Spore forming bacilli were occassionally observed, in others the protoplasm was granular, thus making the resemblance to the tubercle bacillus still more marked.

We can scarcely consider that these varieties are all modifications of one micro-organism. Bienstock and others are of the opinion that there are various common parasitic germs that have acquired peculiar staining qualities due to their growth in the oily secretions from the body. Recently Laser and Czaplewski (8) have each succeeded in obtaining pure cultures of the smegma bacillus, or at least of a micro-organism with similar staining qualities. Their bacillus shows marked variations in form on different media, giving evidence that pleomorphism exists.

Staining Qualities. In considering the staining qualities of the smegma baccillus, we will observe separately its decolorization by acids, by acids followed with alcohol, and alcohol alone.

(*a*) Decolorization by acids. Staining ten minutes in aniline gentian violet at a temperature of 70° C., washing in

water, then in thirty per cent. nitric acid three minutes, the smegma bacilli were still well stained. After six to eight minutes a few were colorless and at the end of fifteen minutes only a few red bacilli could be found. These results are from Bitter's (6) report. Bunge (7) stained ten minutes in carbol-fuchsin and decolorized in Gabbet's solution, which contains twenty-five per cent. of sulphuric acid; even after one and a half hours a few faintly stained bacilli could be found. In pure nitric acid, after five minutes, the tubercle and smegma bacilli were both well stained, but lost their color in fifteen minutes. The same author was able to decolorize the smegma bacillus in one-half to nine minutes in glacial acetic acid. Tubercle bacilli were also decolorized within nine minutes.

(*b*) Acids followed by alcohol. Bitter (3) decolorized for two minutes in thirty per cent. nitric acid, followed by absolute alcohol one and one-fourth minutes. The bacilli were still well stained and retained their color after counter staining with vesuvin. Tubercle bacilli by this method were quite pale after three minutes and entirely decolorized in four minutes.

(*c*) Acid alchohol. Bunge (7) reports the following with acid alcohol: With three per cent. nitric acid in alcohol, the bacilli were well stained at the end of two minutes. Absolute alcohol ninety-seven parts, hydrochloric acid three parts, decolorized most of the preparations in one minute, but occasionally two to six minutes was required. Tubercle bacilli were well colored after twenty minutes.

(*d*) Alcohol. With fifty per cent. alcohol most of the smegma bacilli were decolorized in fifteen minutes, although occasionally a few were found after thirty minutes. In seventy per cent. alcohol ten minutes was usually sufficient, but after forty minutes in one case a few were colored. With absolute alcohol, ten minutes would cause complete decolorization;

however one preparation showed some colored bacilli after three and a half hours.

Bunge (7) reports some interesting results in this connection. The urine examined was strongly ammoniacal, containing much pus and some blood. Staining by the ordinary methods and decolorizing in alcohol for two to three minutes, micro-organisms could be found resembling morphologically the tubercle bacillus, but free from stain. Soon after this the patient died and the autopsy revealed a tuberculosis of the bladder and kidney. In the pus from the kidneys tubercle bacilli could be found possessing the ordinary resistance to decolorization with alcohol; those in the alkaline urine in the bladder were decolorized in two minutes with alcohol. From this report it would appear that a decomposing urine modifies the decolorizing properties of the tubercle bacillus. With this in view I experimented a little on the action of alkaline urine on the tubercle bacilli. To a pure culture of the tubercle bacillus alkaline urine was added and the mixture placed in the incubator for twenty-four hours, cover-glass preparations were then made and stained for ten minutes in carbol-fuchin, temperature 70° C.; as far as I could determine their resistance to alcohol was unchanged, as after one and a half hours in commercial alcohol, they were still as intensely stained as the control specimen.

Attempts to substitute special decolorizing agents as fluorescin have not given better results than those obtained with alcohol.

Previous treatment of preparations with solvents of fats give conflicting results. Bitter (3) allowed specimens to remain in alcohol twelve hours, then in ether twenty-four hours, and found in most cases they were decolorized readily with acids or alcohol. A smear made from a carcinomatous cervix treated in this manner showed well stained bacilli

after three and three-fourths hours in absolute alcohol, although animal inoculations were negative. Tubercle bacilli treated with ether and alcohol retain their staining qualities unchanged as a rule. Removing fats by boiling in alkalies and alcohol deprived both tubercle and smegma bacilli of their resistance to decolorization.

From the above reports we see the smegma bacilli vary greatly in resistance. Individual variations are found among the bacteria the same as among the higher organisms. Some cultures of the golden pus germ are killed in five minutes by a certain antiseptic solution ; other cultures of the same micro-organism are only killed after thirty minutes in the same solution. Variations in tinctorial qualities of the smegma bacillus account for the many conflicting statements found in text books and monographs on this subject. It is not a question of how readily some bacilli are decolorized, but how long the most resistant forms withstand decolorizing agents, that concerns the diagnostician. The more recent and extensive the work of the experimenter on this subject, the greater the hesitancy shown in relying on staining qualities alone for the differentiation of the smegma from the tubercle bacillus.

Since the cultivation of the smegma bacillus it has been suggested that we rely on cultural experiments for its differentiation from the tubercle bacillus. This is impracticable, as the presence or absence of colonies of the smegma bacillus does not prove the absence or presence of the tubercle bacillus.

Animal inoculations means a delay of four to six weeks before a positive diagnosis can be made. Negative results occur occasionally, when tubercle bacilli can be demonstrated in the injected material. It is, however, a most valuable means of demonstrating the presence of the tubercle bacillus and should always be resorted to in doubtful cases.

Reports on a few cases where errors in diagnosis have been made show us that the differentiation of these two micro-organisms is of actual value and not merely a theoretical proposition.

Mendelsohn (9) reports a case where König extirpated a kidney for supposed left-sided tuberculosis and found a pyelitis with stone but no evidence of tuberculosis. König reports another case where he removed a kidney and found it sarcomatous, although tubercle bacilli were reported in the urine repeatedly.

Bunge reports a very instructive case. Symptoms pointed to disease of the right kidney. The urine contained pus, blood and epithelium, but no tubercle bacilli. The patient was given one m. g. of Koch's tuberculin and reacted with a rise in temperature of two degrees C. There was also apparently some increased tenderness over the right kidney and the urine showed many supposed tubercle bacilli. Nephrectomy revealed a renal calculus with pyelitis. Repeated examinations of sections and pus gave no evidence of tuberculosis. Examination of the urine after the operation, staining by Gabbet's method, often showed many well stained bacilli, but never in catheterized specimens. Animal inoculations were also negative.

My own experiments are limited in number and disappointing, in one sense, in results. It was my intention to examine catheterized specimens from cases of cystitis in order to determine the presence or absence of the smegma bacillus in the bladder. We would suppose from analogy that a micro-organism present so frequently on the genitalia and occasionally in the urethra might find conditions favorable for its growth on the inflamed mucous membrane of the bladder. As I was unable to demonstrate it in uncatheterized specimens, I thought it was useless to examine catheterized urine.

In order to obtain uniformity in staining, a small copper box was devised to support the cover glasses in an upright position. It was so arranged that a thermometer could be suspended in the stain and a constant temperature thus maintained. Carbol-fuchsin was used, the specimens remaining in the stain, maintained at a temperature of 70° C. for ten minutes.

Smear preparations from two hard chancres were stained by this method and decolorized with Gabbet's solution for one minute; most of the bacilli were then colorless or stained blue; four or five were found which were a faint pink. These were larger and much thicker than the tubercle bacilli. Decolorization for ten minutes with twenty per cent. nitric acid showed a few faintly pink bacilli, which were readily counterstained in a watery solution of methylene blue. Decolorized for three minutes in ninety-five per cent. alcohol, then counterstaining with methylene blue, one short, thick bacillus stained red was found. It differed so greatly in form from the tubercle bacillus that only reliance on color alone could have led to error. Cultures were made from these two cases on nutrose serum, and although many varieties of micro-organisms developed none of them possessed marked resistance to decolorization.

Five preparations of præputial smegma were examined. After decolorizing for two minutes with Gabbet's solution, twenty per cent. nitric acid or alcohol, all the micro-organisms were colorless or faintly pink, and were readily counterstained with methylene blue. There was one exception to the above. In this case all the micro-organisms present resisted decolorization by acids or alcohol. After thirty minutes in ninety-five per cent. alcohol or the same period of time in thirty per cent. nitric acid both cocci and bacilli were deeply stained and even after one hour were only slightly decolorized. Similar results

were obtained in one case of urinary sediment and is due, I believe, to too intense or prolonged heating in the stain, as it is frequently observed that students in staining for tubercle bacilli are unable to decolorize their specimens if the stain is overheated or allowed to evaporate. Cultures on nutrose serum, from two specimens of smegma, failed to develop micro-organisms with peculiar staining qualities.

Uncatheterized urine from eighteen women was examined. The urine was sedimented for ten minutes with an electric centrifuge and the deposit spread, fixed and stained the same as the preceding preparations, with the exception of the first two specimens examined. These were stained directly in the flame holding the cover glass with a forceps. All others were stained in the copper box previously mentioned. The first of these two specimens was decolorized in twenty per cent. nitric acid for three minutes, then counterstained with a watery solution of methylene blue, one clump of four or five bacilli were found stained bright red and resembling closely the tubercle bacillus with the exception that some of them had swollen ends, presumably due to spores. The other specimen showed a few red bacilli similar in shape, after decolorizing for eight minutes in three per cent. nitric acid, two minutes in commercial alcohol and counterstaining in an alcoholic solution of methylene blue.

In the other sixteen specimens where the staining was done in the copper box at a temperature of 70° C., all results were negative with the exception of an occasional specimen, as referred to above, where all the micro-organisms present retained the stain. Decolorization by weak acids allowed to act for two minutes effectually removed the coloring. Whether by chance some smegma bacilli were present in the two specimens heated directly in the flame, or whether their peculiar resistance to decolorization was due to the more in-

tense heating, I hope to determine at some future time. My own experiments are too few in number to form the basis for any accurate conclusion. Why other investigators have reported the almost universal presence of the smegma bacillus in large numbers in præputial smegma, while I was unable to detect them in the five specimens examined, is not easily explained. It was hardly to be expected that my cultural experiments would have been successful when the smegma bacilli could not be demonstrated in the material used for inoculation, however the cultural experiments of Laser and Czaplewski are open to criticism and must be verified before accepted.

SUMMARY.

(1) Over the entire surface of the body and exposed mucous membrane and especially on the genitalia, bacilli are found which resemble morphologically and in tinctorial qualities the bacillus tuberculosis.

(2) From the external genitalia they frequently gain access to the urine, especially in women, and may be a source of error in the examination of urine for tubercle bacilli.

(3) The smegma bacillus presents wide variations in size and form, thus rendering morphological differentiation frequently impossible.

(4) While most smegma bacilli are more readily decolorized by any of the solutions commonly employed, occasionally they possess equal or even greater resistance than the tubercle bacillus.

(5) Methods of decolorization where acids alone are employed are especially fallacious; acid alcohol or dilute alcohols, unless long continued, are equally unreliable; better but not free from error is the use of absolute alcohol for at least five minutes; in ammoniacal urine, however, such prolonged use of alcohol may also remove the stain from the tubercle bacillus.

(6) Attempts to remove the fat or fatty acids from the bacilli by ether, chloroform or other solvents, fails to furnish us with a means of differentiation.

(7) We must rely on means of excluding the smegma bacillus from the urine. It has never been demonstrated in the bladder and apparently seldom invades the deep urethra, therefore by cleansing the external meatus and withdrawing the urine with a catheter we can exclude this possible source of error.

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REMARKS ON THE TREATMENT OF NEURASTHENIA.

BY HUGH T. PATRICK, M. D., CHICAGO.

For the production of neurasthenia, as for the production of nearly all disease, two conditions are indispensible: First, a noxious agent, and second, a relative vulnerability of the organism or of some part of it. In different diseases and in different individuals the comparative importance of these two etiologic factors varies enormously. Their proportionate importance might be stated in the form of a fraction and called the *etiologic index*, with the external influence for a numerator and the individual susceptibility for a denominator. This index may present a ratio anywhere between a fraction with infinity for a numerator and unity for a denominator, and the other extreme—one for a numerator and infinity for a denominator. To illustrate: A certain force applied in a certain way will invariably fracture the human tibia; a certain amount of hydrocyanic acid introduced into the circulation is invariably fatal. In such a case the etiology is practically all agent, the vulnerability being scarcely recognized. I once saw a man stumble and fall on a level pavement and in the fall break his leg, and I have seen a woman have a violent convulsion from a simple request to do what she did not wish to do. In these examples, the morbific agent was practically *nil*, the personal vulnerability, susceptibility or instability, everything. Ten thousand men might fall as this one did and never break a bone; ten thousand women might receive a somewhat distasteful request without going into convulsions over it.

Now, to the careful observer, the genesis of neurasthenia reveals these two extremes—and every gradation between them. One case may be likened to the fracture of a healthy bone; an individual with a vigorous and resistant nervous system subjects it to a tremendous and prolonged strain and it breaks. The other extreme is like the case of fragilitas ossium just mentioned: a man receives a relatively slight mental shock, or some trivial ictus plants a pathogenic impression or idea, but even this small cause is too much for the kind of nervous organization that he possesses and it suddenly or little by little gives way.

"On the one hand, then, there is true nervous exhaustion; the overdrained, overstrained nervous system that needs principally rest and replenishing; the person worn by work and worry, eaten by ambition or passion, prostrated by profound mental shock, who needs repose, diversion, nutrition. On the other hand, a nervous system, particularly a cerebral center, naturally imperfect in many respects, ever in a state of unstable equilibrium, easily thrown out of balance, producing effects out of all proportion to cause. This is the individual of neuropathic temperament, the victim of his cerebrum. He may be for years entirely normal so far as appearances go and is not unlikely to be brilliant in some respects, but to be possessed of an imperative conception seems to be his fate. He is usually self-centered, hypersensitive, and wanting a perfect co-ordination of mental powers. These are the *zur Krankheit erwahlten* of Meynert, the chosen ones of functional nervous disease, who most severely tax the physician's wisdom and patience.

"A knowledge of these two classes of cases and a just discrimination in estimating the proportionate supremacy of one etiologic factor over the other,—a power to read the etiologic index, if you please, is a *sine qua non* for the greatest attain-

able success in treating the disease, for it is at once apparent that different cases will need radically diverse treatment. The first calls for the rest cure in the widest sense of the term, and little more. We have to do with a state of nutrition and function which is produced by a sufficient cause, and which, under favorable circumstances, we expect to be temporary. With proper precautions hypnotics and sedatives may be given with a free hand. In the second class, we are confronted with a condition that may be, and generally is, in foundation, as unalterable as the leopard's coat. Above all others these are the cases in which the individual is to be managed, and the disease, or at least the symptoms, neglected. To this class belong the neurasthenics whose trouble was started by a slight cause and continued to grow long after the cause ceased to exist. Such are laborers who have become permanently nervous after over-lifting ; such are most of the cases of the so-called traumatic neuroses and post-operative nervous states. Here careful investigation will bring to light a brooding of one kind or another, with the gradual development of a fixed idea that is generally subconscious—a veritable mental possession. These patients are to be vigilantly protected from hypnotics and stimulants. The treatment must be essentially and continuously mental. The mind may be reached from many points and along numerous channels, but the objective point must ever be the same and always in view. Oftentimes these real unfortunates must be trained anew in ways of life and habits of thought. Instead of rest they should be given occupation, and instead of freedom from care gradually increasing responsibility; instead of drugs, personal influence and support. The development of self-discipline, self-control, hope and confidence should be the constant aim, to the neglect, if need be, of dyspepsia, constipation, vertigo, or insomnia. A wide grasp of the subject, a buoyant courage, a ready

tact—these, and not a prolific formulary, make the effective armamentarium.

"As the personal equation is so prominent a factor in treatment, the medical interviews should not be too infrequent. The ordinary experience is that after seeing his physician the patient feels relieved and encouraged—as many of them express it, "lighter" in mind and body. But this exhiliration and improved tone are not enduring, and the patient needs anew his plunge into the fountain of recuperation. Unless the medical adviser can be truly such a fountain he is not the ideal physician. For this reason, more than any other, the practitioner who is really an enthusiastic and persistent electro-therapeutist, hydro-therapeutist or dieto-therapeutist achieves brilliant results with his favorite treatment." (1)

A glance at the type of each extreme will, perhaps, make my meaning clearer. (2) First, the simple neurasthenia.

A lady, aged about 38 years, had been for almost two decades a constant and very intense worker at an intellectual pursuit, was obliged to carry considerable responsibility, and besides kept up a rather wide social connection. In addition to this she had for the last few years been subjected to great strain from personal and family infelicities. She finally "broke down," "went to pieces," and had most of the complaints that go with neurasthenia. Impaired concentration, ready tire, back-ache, constipation, insomnia with audible pulse and hyperesthesia to noises, anorexia, irritability, mental depression, various aching and tender areas, indigestion and gastric fullness, pelvic distress when on the feet—these were the chiefest of her sufferings. She was given essentially the Weir

(1) Slightly altered from the author's article on "Disorders of Sleep," in Hare's System of Therapeutics. Vol. iv.

(2) I hope I may be pardoned if in what follows the personal element seems unduly prominent. There is no desire to obtrude the writer's particular ideas or methods, and certainly no wish to record the tolerably fortunate treatment of a few cases. To present specific examples appeared to be the best means of emphasizing what is believed to be a very important principle in the division and treatment of these multitudinous cases.

Mitchell treatment: that is, she was isolated from family and friends, kept in bed, fed five or six times a day in increasing quantities, received every morning a "sheet rub," and on alternate days an hour of massage and electricity. She saw no letters, read nothing, heard no news, took no exercise and was not allowed to talk.

Circumstances compelled me to limit the time of this treatment to five weeks, but the results were all and more than had been promised. The patient was enabled to resume her work, which she has continued ever since (ten years), although she has been called upon to endure much more than ever before.

A. B., a man of 36 years, single, assistant professor in an eastern college, consulted me three years ago. He was of even temperament, not impressionable, never an extremist, neither sanguine nor the reverse, of good habits and average mental capacity. With limited opportunities, he had educated himself; was first a country school teacher, then successively taught in and became principal of a town school. Not satisfied with this he aimed to be a university professor,—a laudable endeavor, it must be acknowledged, when coupled with adequate intellect. In the present instance it was ill-advised. Either the patient's natural capacity or his already existing brain-fag would seem to have placed a lower limitation to his capabilities than that set by his ambition. In spite of this, his aspirations and industry kept on over-taxing his brain until the point of marked inefficiency was reached. All his mental processes were sluggish, his "reaction time" enormously increased, his work unsatisfactory to himself and to others. To fully restore his normal vigor and astuteness only prolonged rest was necessary. This was not practicable, but on a compromise plan of materially diminished hours of work, materially increased hours of sleep, cold baths and a reasonable amount of out-door exercise, he greatly improved and has

remained in very good health. Of course the rational thing for him to do would be to return to the humdrum but less exacting life of the village teacher.

Now two or three examples of the other type, the neurotic type, the type of "possession," wherein an idea or conception, conscious or subconscious, is the all important element. These are the cases that I particularly wish to emphasize, as their real nature is often unrecognized.

Mrs. B., *æt.* 38, married, the mother of healthy children, was referred to me September 23, 1896, by a well-known gynecologist. Having been of previous good health, but of rather nervous disposition, she had begun, about a year before, to be troubled from the effects of a ruptured perineum. There was some pelvic discomfort and a dragging-down feeling when on the feet, and as the patient desired operation it was done some seven months before she was sent to me. The perineum was repaired, as well as the anterior wall of the vagina. Everything healed kindly and there were no untoward symptoms of any kind except that the patient was rather nervous, became somewhat anxious about her ultimate recovery and was considerably impressed by the suffering and operating in the hospital, of which she saw and heard more or less. It is to be remarked in particular that the fact of these mental impressions was not especially noticed at the time, but was elicited by careful inquiry in subsequent conversations. For instance, it may be cited that a short time before leaving the hospital the patient was taken to the operating room for examination and told to get upon the table. Partly from fright and apprehension, partly from physical weakness, she seemed unable to do so promptly and so declared to the surgeon, who at once picked her up and laid her on the table. This simple procedure made a profound impression upon the mind of the woman, as she subsequently re-

lated to me. She had the *feeling* that something must be very much wrong if she, who was about to leave the hospital, had to be carefully lifted about. There seems to have been no distinct process of reasoning, but simply an impression "in mass," if the expression be allowable, that all was wrong and she a doomed creature. After this, although the operative conditions were perfectly satisfactory, she did not regain vigor and was taken to her home after three weeks, surgically all right but only partially convalescent. She felt very weak, not to say prostrated, discouraged, and also became decidedly exigent in her calls upon her medical attendant. He, being a very busy man and considering her perfect recovery to be simply a matter of a few weeks time, responded when it suited him. The husband took his cue at times from the doctor, at times from the patient, being by turns unduly solicitous and bruskly skeptical. To her fears and doubts, then, the patient had added what she considered dangerous neglect and rank injustice. Then came, by the kindly neighbors, harrowing tales of invalidism, fertile suggestions as to the nature of the trouble and earnest counsel in support of this and that and the other medical man. In due course came the doctors, one, two and three. Of these, one calmly asserted that there was nothing in the world the matter with her, and the other two said that the whole trouble came from a tear in the cervix and that she never could be well until this laceration should be closed. Is it great wonder that she developed marked emotivity, great weakness in the legs, loss of appetite, dizziness, insomnia, palpitation, constipation, indigestion, incapacity for even the slightest occupation, lost her customary interest in home and family and became seriously depressed? Finally came the inevitable Christian scientist and *almost* cured her. But the holy healer, for some reason which I can

not now remember, lost her hold on the patient, who quickly relapsed into her former state.

When brought to me she had, in addition to the above enumerated symptoms, well-pronounced agoraphobia and divers "imperative conceptions." She could not by any strength of resolution force herself to walk alone more than a block away from her home or to cross the street. She could not enter a street car alone, and when she came down town with her husband to call upon me she made him leave the car before it entered the tunnel, as she declared she absolutely could not endure to go through it. To be the sole occupant of a sleeping apartment was veritable agony and to open the eyes on awakening often required all her courage. The imperative ideas were of divers kinds. She could not see a carving knife without the idea of suicide or murder obtruding itself, and she could not even think of the lake without an impulse to throw herself into it.

The results of physical examination were practically negative. Stigmata of hysteria were conspicuous by their absence, and vaginal examination by the surgeon who had operated (and by myself) revealed only a small unilateral tear in the cervix uteri. Muscular development was good, the color was fair and there was no emaciation, although she had lost some in weight.

A positive assurance of recovery was given, but certain conditions exacted. The patient had to promise absolute and unquestioning obedience and consent to complete separation from family and friends. She was put to bed, made to sleep for several nights by full doses of trional; had, besides, enough bromide to quiet her during the day, and after a few days strychnia and kola to make her feel stronger. In addition she had a "sheet-rub" every morning, and almost from the beginning was given hourly calisthenics beginning with a very

few movements and rapidly increasing them in vigor and frequency. Above all, she saw her physician at short intervals. He was her educator and frequent lessons were necessary for rapid progress. When she could not eat enough, I sat by her and commanded, reasoned, persuaded, as tact indicated. I listened to her plaints and dispelled her fears, called attention to the disappearance of each symptom as it went and explained why we could not fail. Most important of all, I got her to look forward instead of pondering the present and the past, to be occupied with each step in advance and to take a pride in what she herself had accomplished. In other words, I aimed to induct a possession of the patient by the idea of progress and recovery instead of by that of hopeless disability. This course of treatment had a superficial resemblance to the "rest cure." In fact it was anything but that. The woman was isolated, not to prevent the wear and tear of company and conversation, but to put her under the thumb of her doctor. She was put to bed, not for physical repose and the conservation of every iota of energy, but simply to remove all occupation except that prescribed. She was given a soporific, not because she was dying for want of sleep, but to demonstrate to her satisfaction that she could sleep all night. Kola and strychnia were administered, not because her waning strength needed stimulants and tonics, but to give her a feeling of strength and buoyancy, for a feeling of well-being is the most powerful suggestion of all. Electricity was used, not to give needed exercise to relaxed muscles, but for its mental impression. Instead of uniform inactivity, frequent, gradually increasing action was the order of the day. At first simply flexion and extension of the extremities while lying down, done by the clock and a prescribed number of times, was the extent of exercise. Then, while on the feet, stooping, bending and squatting movements. (At this stage

I often introduce the Whitely exerciser or light Indian clubs.) When she had done enough of this I took her out for a short walk, having prepared her for it by explaining that when she should be able to do so-and-so much in-doors she would be able to walk a certain distance. We walked this distance. The next half day we increased it and so on until we went about half a mile. Then I preceded her by half a block, and this distance of separation was increased until she walked around the block while I waited for her. After this she went out alone twice a day until she walked two or three miles at a time, when she was allowed to go home. She was in the hospital just two weeks and left a transformed woman, although not absolutely well. She ate what other people ate and plenty of it, slept all night, had regained her natural cheerfulness and courage, showed not a trace of agoraphobia, assisted actively in the household work and did not know she had a womb.

The subsequent history of this case is interesting, but I have given enough for my present purpose; that is, to indicate a treatment radically different from that pursued in the first two cases.

E. W., 28 years of age, merchant, consulted me November 11, 1895. Two and a half years before he had contracted a venereal sore, probably syphilitic, and was almost immediately put upon full doses of iodide and mercury. His stomach had always been somewhat sensitive and this disordered it completely; to use his own expression, he was "all knocked out." This continued into the hot weather, when, one day while driving, he suddenly felt dizzy and prostrated, with palpitation; he was much frightened, dismounted and hurried into a convenient store, drank a pint of whiskey and was taken home. That evening he felt well and the next morning started out as usual, but took a boy along, "in case anything should hap-

pen." In other words, he was more or less timid and apprehensive, and, in fact, a vertiginous attack did occur, with a feeling as if the heart had stopped beating. This alarmed him exceedingly and he started for home in a street car, but before he reached it "broke down entirely" and completed the distance in a cab. He was now a thoroughly scared man, all his symptoms became aggravated and he consulted five physicians within a year. They differed in opinion and treatment but agreed pretty well that he had had a heatstroke. Finally, one doctor assured him that the whole trouble was syphilitic and confidently began inunctions of mercury. On this treatment he improved somewhat and it was continued at Hot Springs, Arkansas, during January and February, 1894. After this he attempted light work and kept at it for six weeks, when the "spells" of dizziness and palpitation returned and he quit work for good. In addition to the frankly nervous symptoms, he had a great deal of trouble with his stomach, and in the autumn of 1894 consulted one of the best and most eminent internal medicine men of Chicago. This physician gave him a careful examination, including a test breakfast, the results of which examination were entirely negative. Hence he was informed, in effect, that there was nothing the matter with him, that his various organs and functions were absolutely normal and that therefore his sickness was all nonsense. Several other medical advisers expressed a like opinion. Later, the patient discovered pin-worms in the stools, and he and the afore-mentioned eminent practitioner hailed them with delight as the cause of all the trouble; and indeed, killing the ascarides of the rectum did have a beneficial effect. But soon all the symptoms, the attacks of faintness and dizziness, the palpitation, the capricious appetite, the depression and worry returned. Again he was put on active mercurial inunctions and large doses of potassium iodide. This imme-

diately made him worse, as it aggravated the indigestion and added diarrhœa to the already existing troubles. As a last resort, all medicine was stopped except digestives, and the diet restricted to koumyss and one or two other easily digested articles. Still the patient did not improve, and in desperation he was taken to a neurologist—a good one—who wisely advised a prolonged stay in a good sanitarium or a trip abroad. For either of these plans the sick man felt himself financially incapacitated, and I was appealed to.

I found a well-nourished, robust young man of good color and general appearance, but nervous and depressed. His father had come with him, as agoraphobia was so pronounced that he could not be alone on the street. Without going into details, I may briefly say that the ordinary neurasthenic symptoms were present, including rapid fatigue, poor mental concentration, asthenopia and seemingly impaired memory, but he complained particularily of stomach and head. He slept poorly and for many months had been sexually impotent.

The results of physical examination were entirely negative. I had to do with a plump and muscular individual who had been subjected to no strain, physical or mental, except the pangs of syphilophobia and the fear of sundry organic diseases, and who was suffering from the mental state elaborated upon these foundation conceptions. He had the symptoms that belong to neurasthenia but he had not true nervous exhaustion. Manifestly the "rest cure" except as a means of mental drill would be out of place in such a case. Instead of repose for an overtaxed brain, he needed to do vigorous and healthy thinking. He was not put in hospital nor to bed, but was given gradually increasing body and brain exercise. On the street he was first put ten feet in front of his companion, this was rapidly increased to a block, and after that he went out alone. He procured a pedometer and by this

the length of his walks was systematically augmented until he was doing from six to ten miles a day. Besides, he had a certain amount of exercise with indian clubs. From the beginning no strict rules of diet were allowed, simply plain nourishing food, in rather small quantities, five times a day. Before breakfast a cold douche was given him and at bedtime a cool or warm bath. At first I saw him nearly every day and administered a *strong* current of faradism, generally to the abdomen, occasionally to the side in the region of the heart, and a few times to the head. This was for its purely mental effect, as there was nothing in abdomen, thorax or cranium that faradic electricity could affect *per se*. It will be seen that with plenty of exercise in divided doses, with two baths and five meals daily, with plenty of time for sleep and frequent visits to his doctor, the patient's time was pretty well occupied. That means that his mind was occupied also, and more than this, both body and mind were busy with the wholesome occupation of getting well. There lay the gist of the whole treatment, and progress was almost continuous. After a few months, carnal desires reasserted themselves in positive fashion, and the patient discovered that he was perfectly virile; but the discovery was made at the price of a gonorrhœa which by its depressing influence somewhat delayed recovery. As soon as he felt pretty well, slept well and could do his various tasks and exercises without fatigue, he was put to work; first for a few hours, then half a day, and so on, until he was in full business activity. At the end of six months he was practically cured, but had occasional trifling complaints for perhaps six months more. Since then he has worked steadily, has married and may be considered an unusually strong and healthy man. Of course he is still of a nervous temperament and remains impressible, and conse-

quently is more liable than another to become the prey of functional nervous disorder.

In September, 1895, I was asked by an eminent gynecologist to see Mrs. A., *æt.* 23 years. At 16 she had had typhoid fever and since that time had suffered from dysmenorrhœa. This monthly suffering gradually increased in severity and duration and after several years took on as accompaniment pain radiating down the left leg, apparently along the course of the sciatic nerve. The periods of pain and soreness finally became so prolonged that there was no intermenstrual interval and the "sciatica" grew to be an enduring disability. This naturally wore upon the patient, and her general health deteriorated in every way. She was operated upon, a cystic ovary being removed and a heavy displaced uterus being anchored to the anterior wall.

Recovery from the operation seemed perfect in every respect; she left the hospital in five weeks and suffered less pain than for years. Three weeks after return to her home, while still rather week and not quite sure of herself, she went out with her husband for a street car ride. Apparently from no particular cause she fainted in the car, and although loss of consciousness was only momentary, she felt much prostrated and very considerably alarmed and her husband carried her the short distance from the car to their home. After this she grew rapidly worse. The natural timidity about entering a street car soon developed into positive agoraphobia; going into a car caused an unreasoning but veritable agony and in a short time merely being on the street alone was perfectly unbearable. All pre-existing symptoms became aggravated, and the patient grew exceedingly nervous. It was thought that a visit to her mother might set her right, but under the fomenting influence of maternal solicitude her fears, pains, disabilities and general nervousness waxed apace.

When I saw the patient, five months after the operation she was in a really pitiable condition. She was thin, pale, emotional, depressed, sleepless and very despondent regarding her condition. She suffered a great deal of pelvic pain and the so-called sciatica had become so bad that, with the general weakness, it confined her to bed or chair. Asthenopia was so advanced that she had given up reading entirely and company made her so nervous that she could not endure the presence of even her dearest friend. Headache was almost constant. All along the spine, about the left hip and at places over the thigh, over the lower abdomen and in the vault of the vagina there was marked tenderness. Without exception the sensitive points were inconstant in position ; that is, they showed the rapid shifting that I described to this Society a year ago (1). It was only with very great effort and considerable pain that the patient was able to walk across the room, going with small and careful steps and carrying the bad leg in a rigid and constrained way. The pelvic organs seemed to be in perfect condition.

It will be noted that without any extraneous reason, without any additional call on the mental or physical vitality and with no more active determining agent than an ordinary fainting spell, this patient had rapidly developed one symptom after another until she had all those of severe neurasthenia, with some belonging to hysteria added. The entire syptom-complex had been built up by a succession, or rather a logical sequence, of mental impressions; of (mostly subconscious) imperitive conceptions, one giving rise to another, the whole founded upon and made possible by an impressionable personality. It need scarcely be intimated that such a course of events, such a pathogenesis, is very different indeed from that of other cases superficially similar. Had there been a period

(1) Medicine, July, 1897.

of prolonged suppuration, or of non-suppurative inflammation with severe pain and deranging adhesions; had it been necessary for the patient when incompletly convalescent to assume heavy physical or mental burdens, the individual symptoms after a certain time might have been very like those from which our patient suffered, but the essential nature of the case would have been quite dissimilar and the fitting therapeusis correspondingly diverse. Clearly, the thing to do to cure this patient was, if possible, to develop an antagonistic set of imperative ideas that should overcome and supplant the others. Incidentally, of course, the physical welfare was to receive attention. With this end in view I advised complete isolation, massage, electricity, graduated exercises and moral treatment, much along the lines already indicated. The plan met with the approval of her physician and he undertook to execute it. She was put into a hospital, the services of an excellent masseuse secured, the nurse gave electricity and the doctor saw her about once a day. I called upon her at the end of a week and found a much discouraged patient. At the end of the second week matters were no better and investigation discovered the play of Hamlet with the role of Hamlet left out. The patient was getting every part of her treatment except the one vital component. Her doctor was an overworked man with many more imperative demands on his time. He would walk into her room, say an encouraging word or two, make light of her various aches, assure her that she was doing finely and depart. Happily, he is a man as liberal-minded as he is efficient in his own special field, and when I expressed a desire to carry out the treatment myself, instant consent was given. I changed the routine not one whit, but for the next few days saw the patient two or three times daily. I learned to know intimately not only all her aches and pains, fears and anxieties, but also her ways of thinking and feeling,

her susceptibilities and obtundities. I unraveled as nearly as lay in my power the *modus gerendi* of her disorder and unearthed the feelings, impressions and convictions that had influenced her. It goes without saying that an adequate understanding of the patient's mental state is a prerequisite of success ; for, as before emphasized, it is the mental state that constitutes the *piece de resistance* of the entire course of treatment. It was the mental state, then, that I proceeded to attack : First, by giving careful and serious attention to all the symptoms and to all the details of the treatment. Second, by symptomatic treatment. As before intimated, the most potent means of mental impression is relief of distressing symptoms. Third, by giving her almost constant occupation. Fourth, by giving her an object to look forward to and keeping it very much in view. Fifth, by inspiring the patient with hope. This was not accomplished by making light of her sufferings, but by judicious explanations, by unostentatiously calling her attention to every improvement, and by teaching her to neglect minor ills and to look forward each day to some definite goal to be attained the next day. Sixth, by stimulating a healthy pride in her progress and especially in that part of it accomplished by her own efforts. This last element, the pride of the patient, is a most potent aid and its enlistment generally an easy matter, for this class of patients are, as a rule, more or less self-centered and their appreciation of approbation very high. To return to the patient : she received no opium or chloral, but for some days had bromide in full doses, with a trional powder at bedtime, a strong faradic current from one to three times a day, as was necessary to relieve some of the pains, and sufficient strychnine, kola and coca to act as a temporary "bracer." Once a day she had an hour's massage (half an hour at first) and at frequent intervals small amounts of easily digested and nutritious food. She was given a "sheet rub"

each morning before breakfast. Over the most tender and painful points two or three blisters were applied. (The thermo-cautery is sometimes better.) For occupation (after a few days of absolute rest, but while the patient was still in bed) the lightest kind of calisthenics was put in at frequent interlats between the meals, bath, electricity and massage. These movements were to be executed a stipulated number of times and at stated hours. They were increased in number, frequency, range, variety and vigor as the patient was able, and gradually led up to stooping, bending and squatting movements done out of bed. These in turn rapidly led to certain prescribed walks in the house, and these last to out-door promenades. The first and second times she went out I accompanied her ; the rest was easy.

Through all of this routine she was informed each day about what her task for the next day would be, and after a little was allowed to look further forward ; for instance, to the time when she should be allowed to sit up, to go out, to see her husband and to go home, attaching to each of these hoped-for events certain conditions to be first fulfilled. In this way the patient was in a way taken into partnership in the treatment and given her full share of credit for the results. Thus she came to look forward to her doctor's coming, not to inform him of a new ache or novel symptom and to beg for relief, but to report what she had accomplished and how well she had done it. Here was the birth of the new ideas and the healthier consciousness.

Improvement was prompt and continuous. After four weeks of this sort of education she walked two miles twice a day without fatigue, slept all night, ate plenty of good food and digested it, had lost her depression and nervousness and was practically free from pain, except headache. It should be added that this headache resisted all treatment directed to its

permanent removal until the lady became pregnant, when her general health improved and with it the cephalalgia. This improvement continued after the baby was born, and her recovery might then be looked upon as completed. But in a case of this character it is never to be forgotten that the abnormal susceptibility remains and that one attack of nervous prostration prepares an easier way for another, and that consequently the patient is never to be regarded as definitely and permanently cured in the sense of being out of danger of relapse or recurrence.

I should like to cite one more case to illustrate the transition or mixed type of neurasthenia, which partakes of the two sorts already described and consequently calls for "mixed" treatment, a judicious combination of the two methods applicable to the extreme types.

H. N., *æt.* 27, an only daughter and single, was perfectly well until the age of 16 when she is said to have had malaria, for which large quantities of quinine were administered. After this, although no disease was evident, she did not perfectly recuperate and was, in a general way, unable to do what other girls did. Still, she was well enough to attend school successfully and when 20 years old entered the University of Michigan, where she followed the usual curriculum for three years. The last of these three years was a "perfect drag." Physical and mental inertia were marked and there seemed to be a general lack of vitality. It was thought that a trip abroad might mend matters and ten months were spent in Europe in the company of her mother. Instead of improving during this time she grew worse and for the next three years passed gradually down the gentle incline leading to invalidism. In March, 1894, the eyes were examined by Dr. Geo. F. Fiske, who found some choroido-retinitis and thought from the appearance that it was probably due to nephritis. I am in-

formed that three examinations of urine at this time were negative except for a very low percentage of urea, but that a fourth showed a faint trace of albumen.

Until about a year prior to consulting me there had been remarkably few particular or striking symptoms, except perhaps the ocular findings. Simple lack of vitality was the crying complaint. The least mental or physical exertion caused fatigue almost amounting to exhaustion. As would be expected, backache and limbache, unsatisfactory sleep, increased distress with menstruation, poor appetite, gastric discomfort, constipation and a general feeling of helplessness and discouragement were not wanting. During the summer of 1896 the gastric distress and anorexia markedly increased and were soon followed by nausea and vomiting. These symptoms remained the most obtrusive ones for a year. In spite of all manner of treatment directed to the stomach and all varieties of dieting scarcely a day elapsed without the stomach rejecting its contents, and most frequently the patient vomited many times a day, apparently retaining nothing of what she ate. Added to the insuperable distate for food, this hyperemesis produced its natural result. The young woman grew weaker and thinner until her time was all passed in bed or on a couch and she could see her friends for only a few minutes at a time.

The findings of my examination were meager. There was no evidence of dilitation, catarrh, ulcer or cancer of the stomach, lungs and heart were normal, as were also the pelvic organs, and no neoplasm or trace of tuberculosis could be discovered. Malaria was excluded. The urine varied in quantity from forty-eight to ninety-six ounces for the twenty-four hours, in specific gravity from 1002 to 1005, and contained neither albumen, sugar nor casts. The percentage of urea was from two-tenths to four-tenths of one per cent. and quantitative analysis by Dr. Wesener, of the Columbus Laboratory, found

two grammes of aromatic sulphates for the twenty-four hours, the normal being about one gramme. The results of urinalysis indicated to my mind simply a low state of metabolism and a sluggish intestinal canal, although an earlier nephritis could scarcely be ruled out with certainty. I found the fundi oculorum normal.(1) Examination of the blood showed a very moderate degree of anemia, amply accounted for by the insufficient alimentation. A search for emotional instability, whimsical succession of symptoms and hysterical stigmata was fruitless. Nevertheless, I thought I discovered an important mental element in the case. Very significant, in my opinion, was the fact elicited that food was rejected almost immediately after eating. This is exceptional in the emesis of organic stomach disease and the rule in neurotic vomiting. On closer inquiry I learned that originally the emptying of the stomach was almost voluntary and was accomplished to relieve the sense of fullness and discomfort that followed a meal. Too much weight cannot be given to this factor in the genesis of neurotic vomiting. I have observed it many times and it affords an excellent index for treatment. Furthermore, it was not very difficult to trace the influence of two solicitous, timid and rather sombre-minded parents, as well as that of some rather injudicious medical advice in begetting a state of cheerful resignation to the inevitable absence of good health.

What was to be done? Make the stomach (or rather the patient) retain a sufficiency of nutritious food, increase the activity of all the processes of nutrition and develop a mental state becoming an active and healthy woman of her age. How was it done? By a combination of mental and physical treatment. First, she was put into hospital and completely isolated from everyone except doctor and nurses. Second, she

(1) This finding has been confirmed by a competent oculist.

was put on Mellin's food in water for 48 hours, with a positive assurance that it would not come up, with an emphatic prohibition from helping it to come up and with a strong faradic current to the epigastrium whenever it seemed about to come up. This diet was *rapidly* increased in variety and amount until, after a couple of weeks, she was taking quite as much as an ordinary adult. Third, she received massage three times a week until able to take considerable active exercise, and for a time general faradization to exercise the muscles. Fourth, after about three weeks of treatment active exercise was begun in very small doses and gradually but steadily increased. Very little medicine was given. Sometimes trional for a hypnotic, bromide when nervous, and some laxative all the time. The hospital treatment lasted two months and during this time she vomited slightly once. At the beginning she weighed eighty-four and one-half pounds (in her clothing) and when she left the hospital her weight was one hundred and twelve pounds. At first she could walk about one block; at the end of the two months she did four miles a day, or its equivalent on a wheel. In conclusion, it only seems necessary to say that every single element of this treatment except the isolation had been tried before with negative result, but the combination of education, alimentation and rest had not been systematically carried out.

DISCUSSION.

DR. C. B. HORRELL, Colchester: In connection with Dr. Patrick's paper I desire to report a case which recently occurred in my practice. I was called to see a young lady, aged 20, of very common parentage, who had sufficient energy and enterprise to have arisen above her environments at birth. Her parents were very ignorant. She had, however, by her own exertions, become educated, was an intelligent girl, and taught school. Not being satisfied with the life of a teacher, she decided to study telegraphy, and was promised a position as soon as she had completed her course. Having completed her course, she was disappointed in not receiving a situation. Before I was called to

see her it was reported to me that she had not had her menses for two days, although they were due. She was exposed to a rain, and there was suppression of the menses. At the end of three days they appeared. She complained of considerable tenderness in the region of the right ovary, and I found her extremely neurotic. I prescribed for her according to the indications, and after talking to her for several minutes in an encouraging way I departed. I was recalled in about two hours thereafter and was told that she was having convulsions. On returning I found her considerably calmed and expressing herself as feeling much better, although I administered antispasmodics. I remained for some time, and gave full directions as to how she should be cared for. I returned home when a messenger came for me a third time, but I was so busily engaged as not to be able to make the third call immediately. I now received new light on the subject, and it seems that some two or three months previously she had fallen and believed that she had ruptured herself. She was not relieved by the remedies I had prescribed for her. In the meantime, another physician was called in the case, and I told him what I thought he would find. He prescribed valerianate of ammonia. He was recalled in about three-quarters of an hour. I forgot to tell him about the rupture. When he made his second visit he discovered the rupture, and after some manipulations the girl commenced to improve and finally recovered.

Dr. Daniel R. Brower, Chicago: I am very glad to have heard Dr. Patrick's paper. He has presented this subject very clearly and wisely, emphasizing the necessity in cases of neurasthenia of individualizing the patients. We have had an immense amount of the Weir Mitchell treatment, it having been impressed upon us very forcibly by that master mind, so that we have come to regard, until recently, the fact that all cases of neurasthenia must be treated by that plan. I am very glad the doctor emphasized the point that a number of cases of neurasthenia are not benefitted by the Weir Mitchell treatment, and that otherwise they are injured by it. These patients do not need absolute rest, but, as the doctor has told us, activity. They need occupation, and the great feature of the Weir Mitchell treatment is occupation without action. Neurasthenic patients, some of them, need action, while others need rest. Each case is a study in itself, and there is no question but what the mental element is the most important, and it is to be controlled by suggestion. A great mistake the profession often makes in the care of these cases is the one emphasized by the essayist. The general practitioners do not see these cases sufficiently often. These patients should make more frequent calls,

and should be more intimately related to their physicians. To attempt to treat a neurasthenic once a week or once every ten days is an absurdity. They must be seen frequently. The effect of one mind upon another is very great in some cases. This treatment is very essential in the management of neurasthenic patients. To keep them devoted to it we must have more frequent intercourse with patients than many physicians think it wise to have. They should be seen frequently in order to impress upon them the importance of mental therapeutics. We should not overlook the fact that very many of these cases, in addition to mental deficiency, are cases of auto-intoxication. The more I have to do with neurasthenia, the more I am satisfied that auto-intoxication has a great deal to do with these cases, and while we are working along the lines of mental therapeutics, we should not disregard auto-intoxication.

Dr. Frank P. Norbury, Jacksonville: I would like to add a word or two in regard to the drug treatment in cases of neurasthenia. I believe that drugs have a place in the treatment of this disease, not perhaps so much as the application of suggestion, but nevertheless there are cases, and many of them, demanding considerable attention from the standpoint of internal medicine. I refer particularly to the lithemic cases. We find a great many of them, especially in college communities, in overworked students, and in the faculties of our colleges. Persons who pay very close attention to work, neglect proper hygienic care, have engrafted upon their general condition that which Dr. Brower speaks of, namely, auto-intoxication, and combined with that we have some rather profound cases. I believe that drug treatment in this class of cases can be of considerable benefit, particularly the use of eliminatives and remedies used for the purpose of toning up the general system, improving the condition of the gastro-intestinal tract, the use of mineral acids, of strychnia, paying proper attention to the control of elimination through the bowels, the use of phosphate of soda, and drugs of that character. Of course, to a certain extent we may depend too much on drugs, but we should not overlook the lithemic condition, as well as the condition of auto-intoxication. Many of these cases have weak hearts. I recall two cases of valvular lesion which came under my observation in the last year. Under proper treatment and regulation of the heart's action I have seen recovery take place from the neurasthenic condition. Mental symptoms also prevail in the majority of cases. In many instances we find that a neurotic tendency is at the base of it. The adolescent cases are an interesting group to me, the cases which we encounter in college students from overwork. I have had several such cases come

under my observation this winter in both the male and female. The male cases manifest lithemic tendencies, there being an introspective field with their concepts of disease, or some delinquencies of various kinds. They dwell upon them, and ultimately they lose their records in college, they lose their ambition, and finally want to pull out of their school work altogether.

Dr. Patrick (closing the discussion): There should not be very much difference between many of these cases as to classification and treatment, and what I shall have to say in answer to the kind remarks that have been made on my paper will be more in respect to terms than anything else. I object to the use of the term suggestion. I much prefer to call it education. It is not proper to confuse suggestion with education. While education is a successive systematic series of suggestions, it is something more than that. From the side of the patient suggestion is largely passivity, and what these patients need is first passive activity and then initial activity. You must start a machine to run by running it, then after a time it will run itself. Suggestion is not sufficient. I think really it is the wrong thing. It conveys a wrong impression to use suggestion in these cases. Suggestion of any kind is of but distinct temporary benefit, but in cases of neurasthenia as a matter of policy it is bad to use the word suggestion, although suggestion has its place. Of course, I did not intend to say that there were only two kinds of true neurasthenia. There is the neurasthenia of intestinal intoxication, the neurasthenia of malarial intoxication, the neurasthenia of lithemic intoxication and the neurasthenia of alcoholic intoxication. We can make as many classifications as we like. I think the two classes, true exhaustion and the possession of an idea, may be used as a working basis, and the cases between them. The more I study the less importance do I attach to auto-intoxication. The people who take all kinds of food in big, liberal quantities, and digest it, get along better than those who do not do so. The less attention we pay to their stomachs and intestines, to their habits and genital tract generally, the better we get along and the more permanent the cure. Lithemia is present in a great many cases, but it is the result and not the cause of neurasthenia. Drug treatment is indicated where we have lithemia, and we cannot get along without drugs. By regulating the diet and prescribing lots of outdoor exercise, not using much alkalies, mineral acids, etc., then the neurasthenia, lithemia and auto-intoxication will take care of themselves.

THE SIGNIFICANCE OF CERTAIN SIGNS AND SYMPTOMS IN HEART INSUFFICIENCY.

BY B. W. SIPPY, M. D., CHICAGO.

The diagnosis of heart disease concerns itself not only in determining the particular lesion present and its cause, but, what is often of greater importance, the manner in which the diseased heart is capable of performing its function.

Mechanically the heart is made up of two sections, a right and a left heart. The right auricle and ventricle constitute the pumping force of the pulmonic circulation. The left auricle and ventricle in like manner supply power for the systemic circulation. We may consider these two circulatory systems as united in one great continuous blood current, with the right and left hearts as pumping stations, at the junction of the systemic with the pulmonic and the pulmonic with the systemic circuits respectively.

The right and the left heart thus considered, sustain each other in their combined effort to propel the circulating blood. These two forces united in the heart, aided by the elastic and muscular coats of the arteries, the so-called vital, capillary force, the pressure of muscles on veins supplied with valves, the aspiration of the blood from the large veins into the thorax during inspiration, maintain the circulation of the blood. Normally the arteries are filled adequately, the capillaries are not overdistended and the veins are emptied in such a manner that there is no undue retardation of blood current, no overdistention of veins, no stagnation of blood in the systemic or pulmonic veins. Such is the work of the normal heart.

The heart may be crippled by disease in either or both of its sections, and still be able to carry on the systemic circulation under ordinary circumstances—practically normally. A diseased heart capable of such work is said to be compensated or sufficient. It is my purpose to treat of the significance of some of the signs and symptoms of heart *insufficiency*. I shall consider briefly insufficiency of the left and right hearts respectively and then more at length total heart insufficiency.

The left heart may become crippled in various ways. Owing to valvular defects at the aortic and mitral orifices or increased work thrown upon the heart by heightened arterial tension, as in chronic interstitial nephritis, the left heart may become incapable of doing its share of the work. Dilatation, compensatory hypertrophy of its walls and damming of blood in the pulmonic circuit takes place. The two sections of the heart sustain each other in their efforts to carry on the circulation. Passive congestion of the pulmonic vessels occasioned by insufficient power of the left heart may be overcome by the right heart. As long as the right heart remains competent, the left heart lesion is compensated, the systemic arteries are filled more or less adequately and the systemic veins are emptied normally.

The chief outward manifestations of this condition, dyspnœa and cyanosis are due to the over distended pulmonic circulation. I shall treat of the significance of dyspnœa and cyanosis more at length in connection with general heart insufficiency.

The right heart may become diseased independently of left heart affections, in the same manner that the left heart may become diseased independently of right heart affections. Increased tension in the pulmonic circuit, due to pulmonary emphysema, fibroid phthisis, disease at the pulmonic or tri-

cuspid orifices, result in similar pathological sequences—noted in left heart affections, namely, dilatation, hypertrophy and final damming of blood in the systemic veins.

The conditions for compensation here are not as favorable, however, as they are in left heart insufficiency. The weakened left heart is sustained by the competent right heart acting on the shorter pulmonic circuit, while the weakened right heart is sustained by the left heart through the much more extensive systemic circulation. Although apparently at a great disadvantage clinically, a perfect left heart sustains an insufficient right heart more or less completely.

The condition of pure right heart insufficiency is relatively infrequent, but evidence is accumulating that, aside from swelling of the liver, over distension of systemic veins, slight œdema, and a tendency to hemorrhage from over distended capillaries, no severe symptoms arise as long as the arterial system is filled by a competent left heart.

Marked œdema and effusions into serous cavities occur only after the left heart becomes weakened. It may be observed that if one of the sections of the heart is diseased and the other is perfectly competent, the circulation is not seriously disturbed. In that statement accidents, such as thrombosis, embolism, hemorrhage, acute dilatation, heart rupture, etc., are not taken into account.

Both the left and the right heart may be crippled at the same time by various causes as an adherent pericardium degeneration of the muscular fiber of the heart from arterio-sclerosis of the coronary arteries, fatty degeneration or chronic nephritis.

The same may arise from protracted over-work, malnutrition, or prolonged nervous disturbances, as in ex-ophthalmic goitre.

Valvular disease may affect both sides of the heart primarily or as a result of incompetency of the left heart. The

increased work thrown upon the right heart results in pathological changes in its walls, namely, primary hypertrophy, dilatation, secondary hypertrophy, and finally dilatation may exceed the hypertrophy.

The combined compensatory changes in both the diseased left and right sections of the heart may be able to carry on the circulation under ordinary circumstances more or less perfectly. Such a diseased heart is said to be compensated or sufficient. Under these circumstances there are no dangerous persistent symptoms, and what is of great practical moment, the management of such a case resolves itself into the observance of certain precautionary measures, such as avoiding overwork, either physical or mental, attention to the general health and measures directed to the prevention as much as possible of the progress of the disease.

When the favorable condition, compensation, no longer exists, the central power of the circulation is unable to cope with its work. The arteries are not adequately filled, the capillaries are not filled and emptied normally, the weakened overdistended heart cannot receive the normal quantity of blood from the systemic veins, therefore the veins are overdistended. The pulmonic circulation is similarly affected and the condition general heart insufficiency obtains.

Now active treatment must be instituted. Medical skill must be combined with the intelligent co-operation of the patient to obtain the best results. Obviously to recognize the early, as well as the late signs of total heart insufficiency, is of the greatest importance.

Owing to its anatomical relation to the heart, the liver is one of the very first organs to respond to general passive congestion.

The circulation of the liver is directly connected with the heart through the hepatic veins and vena cava inferior. The

organ is made up largely of capillaries and the tension of the circulation in the liver is comparatively low. The connective tissue of the liver, when not cirrhotic, is easily distended. It lies free in the abdominal cavity, suspended from the diaphragm, uncompressed by surrounding organs. Its capsule is thin and easily distended. All the conditions for change in volume are present.

As soon as the heart, as a whole, becomes insufficient, as defined by imperfectly filled arteries, distended capillaries and stagnation of blood in the systemic veins, the over-filling of the vena cava inferior is transmitted to the venous radicles of the liver and their general engorgement is evidenced by swelling of the organ and pain due to pressure on the nerve filaments supplying the liver and its capsule. If heart insufficiency is of small degree, the enlargement of the organ and pain will be correspondingly slight. If the heart soon becomes compensated, the liver enlargement disappears and the pain ceases. If the central force of the circulation becomes incompetent to a marked degree the liver enlarges proportionately, and depending on the acuteness of the distention of the liver, pain becomes a prominent subjective symptom.

Normally, the liver is not palpable in the mammary line at the costal arch. The border of a liver of passive congestion, usually blunt and resistant, may be palpated one, two or three finger's breadths below the costal arch. It may reach the level of the umbilicus or even lower. Characteristic of such a liver enlargement is fluctuation in its size from day to day. The pain may approach that of acute inflammation.

If, under the influence of rest and digitalis, the heart becomes sufficient before connective tissue growth takes place to any appreciable extent, an enormously enlarged liver may return to its normal size. If, on the other hand, passive congestion is prolonged, connective tissue growth will take place cor-

responding to the degree of heart insufficiency and the length of time it is present. Such an organ may never return to its normal size, but remain in a condition of chronic enlargement even though compensation be established. It will not be tender on pressure and the other signs of heart insufficiency will be absent.

As a rule, so accurately does the organ respond to the influence of passive congestion that the liver may be considered *the index* of the heart's sufficiency. Liver swelling and tenderness appear, as a rule, some time before other signs of passive congestion are apparent, such as œdema of the lower extremities, over-distended veins of the neck, ascites, etc. They are the last to disappear as the heart becomes compensated.

Prolonged passive congestion of the liver may give rise to a sub-icteric condition of the skin and conjunctivæ, which, combined with cyanosis, results in a peculiar dark greenish-yellow hue that suggests to the experienced, passive congestion of the liver and heart disease.

The spleen is usually protected from marked enlargement by the liver. The ascites of a heart insufficiency appears generally after the liver is greatly enlarged, the veins of the neck are visibly distended and œdema of the lower extremities is pronounced. Following this may appear hydro-thorax, hydro-pericardium and œdema of the meninges and ventricles. Very important evidence is afforded by carefully considering the urine. Possibly there is no block on which the general practitioner is more likely to stumble than in confusing the clinical picture of heart and kidney lesions.

The urine in heart insufficiency is diminished in quantity, highly colored, of high specific gravity, and as a rule contains a trace of albumen. Albumen may be continously absent. As long as the degenerative changes of a nephritis are absent, the

quantity of albumen will usually remain a trace. Hyaline casts, red and white blood corpuscles and epithelial cells may be present. A considerable quantity of blood in the urine may be due to a kidney infarct. Such is the urine in passive congestion of the kidney. If the urine contains a large quantity of albumen, granular, fatty and epithelial casts, elements indicative of degenerative changes in the kidney structure, the kidney is no longer that of simple passive congestion but a parenchymatous nephritis complicates the heart lesion. A nephritis may result from prolonged passive congestion, but this is comparatively rare. Very often the same infectious disease that resulted in the heart affection may have predisposed the kidney to the degenerative changes of nephritis.

The quantity of urine excreted in heart insufficiency is dependent much more on the diminished arterial tension in the kidney than on passive congestion and is of great prognostic value. In severe cases, the quantity excreted may sink as low as six or eight ounces or even lower during twenty-four hours. If under the influence of rest and heart energists, the quantity of urine still remains low, is not increased within a comparatively short time, we may conclude that we have to deal with a heart in which the conditions for compensation, at that time at least, are not very favorable. If the heart muscle is capable of responding readily to rest and digitalis, the quantity of urine will begin to increase possibly within the first twenty-four hours. At the end of three or four days, kidneys that were excreting six and eight ounces during twenty-four hours, may excrete a normal or even twice the normal quantity of urine. The measured quantity of urine passed from day to day is one of the most accurate guides we possess as to the effect of our therapeutics in a given case of heart insufficiency.

Direct evidence of over distention of veins due to heart insufficiency is best observed in the veins of the neck. In

individuals of spare adipose, a slight pre-systolic pulse wave may be observed in the superficial veins which is produced by the auricular contraction. This is known as the physiological or negative venous pulse. The time of venous pulsation in the neck is best determined by comparing it with the carotid of the opposite side. In heart insufficiency the over distended cervical veins stand out more or less prominently and the pre-systolic wave may become greatly exaggerated.

In tricuspid regurgitation the pre-systolic wave produced by the contraction of the auricle is sustained and increased during systole by the stream of blood forced through the incompetent tricuspid valve into the auricle and systemic veins. This gives rise to a pre-systolic—systolic pulsation of the over distended veins. This is also known as a positive venous pulse and is indicative of tricuspid regurgitation. Accompanying this we may often determine that the enlarged liver presents bimanual palpation, an expansile pulsation, systolic in time. In general, visible engorgement and pulsation of the veins of the neck should always suggest the probability of a heart insufficiency and cause us to look for corroborative evidence. The pulsation is diffuse and easily obliterated. On palpation one obtains the impression of air in thin walled rubber tubing. Arterial pulsation in the neck is circumscribed over the course of the carotid, resisting and accompanied by throbbing temporals and over filled radials.

Cyanosis from heart disease is not indicative of total heart failure. A certain degree of cyanosis accompanies left ventricle insufficiency, that is compensated by the right heart. The cyanosis increases in proportion as the whole heart becomes incompetent.

Dyspnœa arising from cardiac disease is present in compensated as well as in uncompensated lesions. In left heart insufficiency the slowing of the blood current in the pulmonic

circuit, and the attending bronchial catarrh, contribute only in part to the disturbance in respiration.

Over distention of the blood vessels increasing the volume of the lung and diminishing its elasticity, is the chief cause of severe cardiac dyspnœa.

The conditions for over distention and rigidity are present in left heart insufficiency with a competent right heart, since blood is dammed in the pulmonic circuit and a normal quantity is forced into the already over distended veins by the right ventricle. Under these circumstances, if the right heart becomes incompetent and thereby less able to engorge the pulmonic circulation, provided the condition of the left heart remains unchanged, the pulmonary over distention is relieved and the severe dyspnœa for the time being disappears.

We may observe not infrequently that patients breathe with much less difficulty and declare themselves better with the appearance of liver swelling and œdema of the lower extremities. Then as the œdema and liver swelling disappear the dyspnœa increases. Thus marked dyspnœa and signs of systemic passive congestion may alternate.

If the left and the right heart grow weaker at the same time and in about the same degree, dyspnœa does not disappear on the appearance of systemic passive congestion, but becomes greater as the growing incompetency of the heart results in ascites, hydro-thorax or hydro-pericardium, adding mechanical hindrances to the circulation.

DISCUSSION.

DR. JAMES B. HERRICK, Chicago: *Mr. President*—We are all indebted to Dr. Sippy for having called our attention to facts that are of great importance. I am sure it is a mistake we are all apt to make, namely, of merely treating our cases of heart disease and not considering the question as to whether the heart is insufficient or not, or is the heart doing fairly good work? It is the same mistake we hear so often spoken of, namely, of giving digitalis to every patient with heart

disease. If we keep clearly in mind the facts Dr. Sippy has so well brought out, we can much more accurately deal with the condition of the heart, more accurately as to the prognosis, and institute much more rational treatment.

The points brought out with reference to examination of the veins of the neck, of the liver, examination for transudates in various parts of the body—those are points of great importance.

The examination of the urine is certainly one of the facts that should not be overlooked, and it seems to me that possibly Dr. Sippy has stated the case a little too positively when he says that in congestion of the kidney we never get more than a trace of albumen. I am sure I have seen cases of congestion of the kidney in which there was quite a large and distinct trace of albumen, yet the subsequent history of those cases was a very rapid clearing up of the albuminuria and its total disappearance under rest and proper treatment for cardiac disease.

Dr. J. Homer Coulter, Chicago: It occurs to me that if Dr. Sippy had presented this paper to the Society ten years ago just as he did to-day, it would have fallen flat merely on its scientific value and interest. This demonstrates not only the advance the Doctor has made, but the advance that internal medicine especially has made and is making along the line of heart diseases and diseases of the chest generally. I think possibly there has been more advance in this line than in any other. The paper is of great practical value along the line of life insurance examinations.

I am further convinced that if this paper is studied and made a basis of life insurance examinations in relation to those hearts in which we find some pathological condition present and which we may be able to distinctly settle, we will have arrived at something definite in our own minds. If we take the symptomatology delineated by the Doctor and combine it with the conditions which we find presented in these cases, we will be able to send to the medical director such a report as will be intelligible to him and avoid the occasion for returning it for information, as well as doing a possible injustice by turning down a good risk.

Dr. Sippy (closing the discussion): In relation to the trace of albumen instanced by Dr. Herrick, I believe I stated that as a rule there was but a trace of it in a kidney with passive congestion. Of course, in our diagnosis we never rely on one sign or symptom. We all know that in so-called physiological albuminuria we have large quantities of albumen when no anatomical lesion is demonstrable. So in passive congestion of the kidney, we may have more than a trace of albumen,

but as a rule it remains a trace. When we find large quantities of albumen in connection with hyaline, epithelial or fatty casts, elements indicative of degenerative changes in the kidney structure, then we no longer have a passive congestion of the kidney, but a real nephritis is present.

I did not attempt in the short time alloted me to treat this subject exhaustively, but to draw a few conclusions. It emphasizes the point that nowhere in the realms of medicine must we look upon these cases from a broader standpoint than when dealing with lesions of the heart. The practice of basing one's conclusions chiefly or entirely as to the condition of the heart upon the presence or absence of heart murmurs is altogether wrong.

THE THERAPEUTIC USE OF DIGITALIS AS SHOWN BY ITS PHARMACOLOGIC ACTION ON THE CIRCULATORY ORGANS IN MAMMALS.

BY S. A. MATTHEWS, M. D., CHICAGO.

Nearly a century ago Withering observed that digitalis slowed the heart in man, and Schiemann observed the same phenomena in the lower animals. Blake, in 1839, observed that the blood pressure was raised by the injection of the infusion of digitalis into an artery. The explanation of these two facts, viz., the slowing of the heart and the increase in blood pressure engaged the attention of pharmacologists for a number of years, and constituted the sum-total of our knowledge of the action of digitalis for a long time. In 1851 Traube stated that the slowing could be removed by section of the vagi in the neck, and therefore ascribed it to stimulation of the cardiac inhibitory apparatus in the medulla oblongata. He further claimed that digitalis in larger doses, after stimulating the vagus center, causes paralysis of the same center, thus removing all central inhibition of the heart, which increases to a rate far exceeding the normal. These conclusions of Traube were contradictory to the statement of Stannius made about the same time, that digitalis acted only on the heart muscle.

In 1853 Blake's discovery of the rise in blood pressure, along with the slowing, was re-affirmed by Leutz and Breguet, who concluded, along with Winogradoff, who could detect no change in the blood pressure during the slowing, that the

slowing could not be due to central vagus stimulation, as stated by Traube, as that would necessarily lower the arterial pressure.

In 1861 Traube again took up the work, and made a long series of kymographion experiments which agreed with those of Leutz and Brequet in showing a marked slowing of the heart's action, accompanied by an increase in the blood pressure. While still holding to his first theory of central vagus stimulation as the chief action of the drug in slowing the heart, he had to devise some other explanation for the rise in blood pressure. He therefore assumed that both the inhibitory and the accelerator nervous mechanism of the heart were first stimulated and later paralyzed, the action on the inhibitory apparatus preceding that on the motor in both cases. He also observed that section of the vagi in the neck did not always remove the slowing, and therefore assumed that the intra-cardiac inhibitory nerves were stimulated as well as the centers in the medulla oblongata. While the facts demonstrated by Traube's experiments, viz., that digitalis in small doses slows the heart by vagus stimulation and raises the blood pressure, and in larger doses quickens the heart and eventually lowers the blood pressure, have been corroborated by most all following investigators, his explanations did not find general acceptation. While his explanation of the cause of the rise of blood pressure might, in a way, explain the acceleration of the heart which follows the slowing, it does not explain the increased pressure accompanying the slowing. Klug and a few others have denied that the inhibitory apparatus *in the heart* has anything to do with the slowing, and maintain that the action is wholly central, and that it is entirely removed by section of the vagi in the neck, although Klug agreed with Boehin and others that the irritability of the vagus is increased after the administration of digitalis.

On the other hand, such workers as Marme, Ackermann, Bulgari, Schnabl and others agreed with Traube that section of the vagi does not entirely prevent the slowing, and Ackermann demonstrated that the administration of atropin did so. As his experiments have been repeated by more recent workers, with similar results, it seems conclusively proven that digitalis slows the heart by stimulating its inhibitory nervous mechanism, both centrally and peripherally, the central action being the more powerful.

Again, Traube's explanation of the acceleration of the heart in the latter stages of digitalis action, as due to paralysis of vago-inhibitory nerves of the heart, can hardly be conceded, for Ackermann found the same acceleration in hearts in which the pneumogastric influence had been removed from the first by atropin.

But after considering from a physiologic standpoint the several factors that might play a role in the causation of this phenomenon, viz., the paralysis of the cardiac inhibitory apparatus, or the increased irritability of the motor ganglia in the heart, or the paralysis of the inhibitory apparatus together with the stimulation of the accelerator system, the fact so much overlooked by the older writers, that the heart muscle is undoubtedly acted on by digitalis renders it unnecessary to assume any action at all on the so-called motor ganglia in the heart, or on its more or less doubtful inhibitory or accelerator mechanism. It has been frequently shown that the heart muscle shows a much greater tendency to beat than if suspended in normal blood, and also if the non-ganglionated apex of the frog's heart be placed in blood containing digitalis, it shows the same increased irritability as the ganglionated muscle. Also, Harnack and Witkowski have shown that one of the effects of increased irritability of the cardiac muscle is a diminution of the inhibitory influence of the pneumogastric.

Schmiedeberg, working with frogs, found that digitalis is tended to remove the diastolic standstill of the heart after muscarin. In fact, I have often observed the same phenomenon in the heart of dogs poisoned by aconitin or veratrin, which in the later stages of poisoning cause a very rapid heart action, over which the pneumogastric has very little control, as shown by electric stimulation. After making numerous experiments to determine this point, Cushny has suggested the following:—"*Although the fatigue of the inhibitory apparatus due to continued stimulation may in part account for the acceleration of the heart in the later stages of digitalis action, a part of far greater importance is the increased irritability of the heart muscle, which refuses longer to be controlled by the inhibitory impulses.*"

Further, Cushny, by examining a great number of myocardiographic tracings taken from the dog's heart, was able to make out very satisfactorily these two opposing forces in digitalis action. First, a stimulation of the pneumogastric both centrally and peripherally, which tends to slow the heart and decrease its contractions; and second, an increase in the irritability and contractility of the cardiac muscle, which tends to increase the frequency of the heart and also to increase its contractions. The two forces he found to be in action from the first, and the acceleration only indicates that the muscular action has overcome the inhibitory action, according to the fact pointed out by Harnack and Witkowski—that increased irritability of the cardiac muscle tends to do away with vagus inhibition.

In the experiments of Cushny just referred to it was often observed that in the dog the irritability of the heart was so much increased that it was accelerated beyond the normal, and that electric stimulation of the vagus was entirely without effect on the rate of the ventricle. In a few experiments,

however, the vagus remained active to the last, while in a few others the rate was unchanged, but a tendency towards the diastolic position was observed in the ventricle, and a lessening of the size of the beat of the auricle.

The cause of the rise in the blood pressure has been no less a question for investigation than the action on the heart muscle. Here, until quite recently, two views were held: one school of pharmacologists holding that the rise in arterial pressure following the administration of digitalis to be due to the changes in the activity of the heart; the other holding that along with the changes in the activity of the heart there occurs a contraction of the arterioles, which plays an important role in the rise of blood pressure. The first of these views is generally held by the Schmiedeberg school. Schmiedeberg himself claims that if digitalis exerts any contracting influence on the arterioles, it is only of a transitory nature, and that the rise in blood tension is simply due to the increased activity of the heart. Blake, working with the hæmadynomometer, found that the injection of an infusion made from four grammes of the liver into the jugular vein of a dog causes the pressure in the femoral artery to rise from 5 to 8 inches. He further observed that after digitalis the arterial pressure fell very slowly after the cessation of the heart's action. Traube also observed that after large doses of digitalis the arterial tension kept high in spite of the frequent weak and irregular cardiac action. Leutz further demonstrated that coincidentally with the rise in blood pressure, the pulse rate remaining constant, a marked diminution in the velocity of the blood stream took place. This he could only explain by assuming that a contraction of the arterioles had taken place, causing a slowing of the main arterial stream.

Von Bezold compared the rate of fall of the blood pressure after division of the spinal cord under normal conditions and

under digitalis, and found that under digitalis the rate of fall was not more than one-half of that occurring under normal conditions. This he explained on the assumption that a contraction of the arterioles had taken place under digitalis, thus offering an increased resistance to the emptying of the arterial system.

In a recent study on the cause of the rise in blood pressure produced by digitalis, by Brenton and Tunnecliffe, they found that although the initial pressure in the aorta was increased, yet the blood pressure during the cardiac diastole, instead of falling more rapidly, as it ought to do if the arterioles remained unchanged, fell more slowly, and the descending limb of the kymographion tracing became more obtuse. Further, they found that after large doses, sufficient to cause very small and irregular cardiac action, the blood pressure remained high, and also in experiments in which they arrested the heart for 8¾ seconds by electric stimulation of the vagus, they found that without digitalis the pressure fell 37 m. m., and that after the injection of 0.02 grm. of digitaline, the pressure rose 10 m. m., and as a result of vagus stimulation for four seconds the pressure remained 10 m. m. higher than without the drug. These experiments show a diminished rate of fall under increased initial aortic pressure, and can only be explained by assuming a contraction of the arterioles.

The question arose about the part played by the vaso-motor center in the causation of the rise in blood pressure. But as the rise occurs after division of the cord, as shown in Von Bezold's experiments, as well as before, the question seems to be settled as follows: That while in normal animals the vaso-motor center may participate to some extent in the rise, it is not at all essential, and also that while the increased activity of the heart may, and actually does, play a part in this phenomenon, the principal cause of the rise in blood pressure

following the administration of digitalis is a contraction of the muscle fibers in the walls of the arterioles independent of any nervous mechanism.

In 1896-97 Cushny, assisted by the writer, made a long series of myocardiographic tracings, taken from the dog's heart after the administration of digitalis or strophantin, both drugs having exactly the same action, as shown by many myocardiographic tracings.

Experiment 1, in which a large dog was used, narcotized by morphine and curare, and the myocardiograph attached to the left ventricle. In two minutes after the injection of strophantin into the jugular vein, the rate of the heart had fallen from 35 beats in 10 seconds to 22 beats, or about 87 per cent. The systolic contraction had increased from 26 m.m. to 20 m.m., the diastolic from 38½ m.m. to 43½ m.m., and the size of the heart from 12½ m.m. to 23½ m.m.

Experiment 2, in which a medium-sized dog was used, narcotized with morphine alone, and myocardiograph attached to left ventricle. In ten minutes after the injection of ½ mg. strophantin into the vena saphena the rate of the heart had decreased from 16 beats in 10 seconds to 12. The systole had increased from 48 m.m. to 37 m.m , the diastole (differing from the first) had decreased from 63 m.m. to 57 m.m., leaving an increase in the relative size of the heart of 15½ m.m. to 20 m.m.; two and a half minutes later the rate of the heart was 4½ beats in 10 seconds, when the vagi were cut, and the heart immediately returned to 16, its normal rate. The systole increased considerably, while the diastole decreased.

In the first of these experiments we notice the rhythm of the heart slowed, the height of the systole above the base line was diminished, *i. e.*, the systole was more complete, while the distance of the diastole from base line was increased, *i. e.*,

the relation was increased, and the excursion of the writing lever was lengthened.

In the second experiment the same phenomena were manifest, except in a smaller degree, but with the marked difference that the diastole was actually decreased.

The cause of these three changes in the heart's action, viz., slowing, increased contraction, and either increased or diminished relaxation, are readily determined from physiologic facts. The slowing, as shown by Ackermann, is due to vagus stimulation, and is wholly removed by the administration of atropin. The increased systole is evidently due to direct action on the heart muscle, as it occurs in atropinized hearts as readily as in those in which the inhibitory apparatus is in play, and is altogether independent of the latter, which would have a tendency to decrease the contracting and increase the residual blood in the heart. The position of the diastole is somewhat more complex, as it is due to the interaction of several factors, viz., vagus stimulation and muscle action. It is well known that stimulation of the vagus tends to increase the diastole, and as no increase takes place when atropin is administered before the increase in diastole generally following the administration of digitalis may be looked upon as due to vagus stimulation. But just why in some cases the diastole remains normal, or is actually decreased, is not so easily explained. Anthony has suggested the possibility of its being due to the condition of the individual heart. His experiments seem to indicate that when the heart is weakened from any cause, an excess of narcotics, and begins to relax, as it always does under such conditions, digitalis seems to lessen the relaxation, while, if the muscle remains fairly strong, no such action follows. As it is known that digitalis increases the irritability and contractility of the heart muscle, it is not at all unreasonable to expect such an action upon weakened,

relaxed hearts. This is in keeping with the well known fact that muscle tissue when under the influence of poisons is often more refractory to nervous impulse, and here the probability is that the inhibitory influence is entirely done away with on account of the condition of the injured cell, whereas, if the muscle is in a normal condition, the inhibitory gets in its work. In fact, clinical observations go far to prove this assumption.

Some time ago Dr. Arthur R. Edwards had the opportunity to make some very careful and interesting observations in a case of acute aconitin poisoning, in which a man, aged 30, took five or six grains of the alkaloid aconitin after an intoxication. On examination the patient was cyanosed, respiration very rapid, the pulse 140, and complaining of considerable tingling in the extremities, and especially in the mouth. No vomiting occurred for about half an hour. The heart sounds became very weak and could not be heard by direct auscultation. The pulse could not be felt, and the skin covered with a heavy sweat. The heart was dilated, especially towards the left, and when first seen the apex was in the left anterior axillary line. In twelve hours half an ounce of the tincture of digitalis was given intra-venously. The apex beat began to travel inwards, and within three hours after the first dose of digitalis, had resumed its normal position—the difference in location being three fingers' breath. This case illustrates exactly the action of digitalis on a weakened, relaxed heart, due to acute poisoning. In fact, I have observed the same phenomenon occurring in animal experiments in which sufficient aconitin had been administered to render the heart's action very rapid, weak and irregular, the heart tending more and more towards an exaggerated diastolic position, with very small systolic contractions approaching delirium cordis. During such a stage of aconitin poisoning, the inhibitory influence of the vagus is almost thrown out of play through the

excessive irritability of the heart muscle, but the contractility of the heart is very much weakened, so that it is in a state of extreme dilatation, beating very rapidly and incompletely. Under such conditions the muscular action of digitalis is only present, and is characteristic, *i. e.*, it increases the contractility of the heart so that it is able to make full or even exaggerated systolic contractions. The circulation thus being much increased by the complete emptying of the ventricle, the heart is soon able to assume its normal diastolic position, or due to its increased irritability may contract shortly before its normal position is reached. Therefore we are justified in attributing the phenomenon, although present in only a small number of animal experiments and in hearts seemingly weakened from excess of poison, etc., to a direct action of the drug on the heart muscle, in keeping with its characteristic action. By taking tracings on rapidly revolving drum the following features can be made out: The slowing is shown to be due mainly to the prolongation of the diastolic pause, the actual time spent in the act of contracting is slightly shortened, while that of relaxation remains normal. The time spent in a state of actual contraction is lengthened, generally in therapeutic closes from one and one-half to two times, while the diastolic pause may be lengthened from six to ten times. The prolongation of the diastolic pause is due to stimulation of the inhibitory apparatus, and is entirely wanting after the administration of atropin. Judging from the action of digitalis on cold-blooded animals, the prolongation of the systole might be considered a muscular action, for here its characteristic action is to lessen diastole and to lengthen systole, until the heart finally comes to a systolic standstill. But in warm-blooded animals the prolonged systole is not present after atropin, and in the slowing caused by electric stimulation of the vagus the same systolic pause is present. Therefore this

phenomenon is accounted for on the theory of inhibitory stimulation.

The phenomena so far described are those following moderate doses of digitalis, and are the changes in the circulatory organs coming within the therapeutic use of the drug. This stage may last for a comparatively long time with few variations, provided the proper quantity is administered, Finally, what therapeutic suggestions can we gather from these pharmacologic facts, and what influence have these changes on the diseased circulatory organs?

Of course, Traube first thought the slowing was the essential factor, and this suggested to his mind its use in cases of tachycardia. In fact, digitalis may affect some such cases beneficially, but if its good effects in cases of too rapid heart action are due to its vagus action, other drugs, as aconitin and veratrin, which have a more powerful inhibitory influence, while lacking the muscular action, could be used for this purpose much in preference to digitalis. But aconitin and veratrin, notwithstanding their marked slowing influence on the heart, cannot replace digitalis, even in many cases of tachycardia, so its inhibitory influence cannot be considered an important factor in its therapeutic use, or even a factor at all.

Next to its slowing influence, the increased arterial pressure has been considered as an important factor in its therapeutic use, especially in steadying and slowing the heart, but as an equal or greater arterial pressure can be obtained by the use of strychnine, caffein and other drugs, which cannot replace digitalis in such cases, the increased blood pressure cannot be held as a necessary factor in its action, although it may play some role, as will be mentioned further on.

The next factor, and one to which much importance has been attached, is the increased diastolic dilatation, together with a prolonged diastolic pause four to eight times greater

than the normal pause. If the good effects of digitalis could in any way be attributed to these phenomena, aconitin and varatrin could well claim a superiority in these respects. It has been held that on account of the increased diastolic dilatation, the heart is enabled to hold more blood and thus be able to expel more at each contraction, increasing its output per beat and unit of time. Such would be the case provided the systolic contractions remained the same. But in all cases such a diastolic dilatation is brought about through vagus inhibition, which always tends to lessen the systole and increase the residual blood in the heart, and will be pointed out further on as in direct opposition to the muscular action of the drug, and cannot be considered other than a drawback in its use. For the prolonged diastolic pause it is claimed that the blood has a longer time to circulate through the heart muscle, which, together with the longer rest period of the muscle, contributes largely towards its increased nutrition. But here the heart is not permitted to rest in a normal state of relaxation, but in an over-distended state, due to its contractions being lessened, thus allowing the residual blood to accumulate to a degree almost approaching stasis. Such slowing and decreased contractions would necessarily lower blood pressure, bring about a sluggish blood stream, which is in direct opposition to the desired effect. So this, as well as all the other vagus influences which oppose its muscular action, are undesirable features.

The next point, and the only one of therapeutic value, is its muscular action, as already explained. Both the irritability and the contractility of the muscle are increased, so that the heart muscle tends to contract more readily, as well as to contract to a greater degree. The tendency of these changes is to shorten the relaxation and lengthen the systolic contraction, thus lessening the residual blood in the heart. These changes

brought about in the heart muscle have a direct influence, but in an opposite direction on the heart under certain pathological conditions. First, in ordinary acute dilatation of the ventricle not dependent on valvular lesions, but generally following acute poisoning, as with aconitin, excess of narcotic, or in certain shock or CO_2 poisoning, etc., we find the ventricle not only overdilated in diastole but also we find the systole is short and incomplete, thus permitting a large excess of residual blood. This condition is progressive, the ventricle tending more and more towards a dilated diastolic position, while the contraction becomes shorter and more rapid, finally ending in delirium cordis ; hence the reason for the quick, almost imperceptible heart-beat and the low, imperceptible pulse often occurring in such cases. In these cases the inhibitory influence of the vagus is almost suspended, as shown by electric stimulation ; so digitalis only exerts its muscular action, and that in a most characteristic manner. First, the shortened systolic contraction is lengthened and the residual blood lessened, thus increasing the output of the heart. Second, the exaggerated relaxation is lessened, due to the increased tendency of the muscle (irritability) to beat. These two changes overcome the changes in the opposite direction and also, on account of the re-establishing of the circulation, the normal nutrition of the heart is again established and it begins to functionate in a rhythmical manner. Third, in cases of valvular disease of sufficient severity to cause any symptoms or inconvenience on the part of the individual, the heart is more or less dilated, the dilatation being due to the imperfect manner in which the blood is passed through the heart and to the increased work of the heart muscle to overcome the valvular insufficiency. The extra work imposed on the heart muscle always produces one of two results. If it is not beyond certain physiological limits, the muscle gradually increases in

size and strength to a degree sufficient to do the extra work without fatigue. Such a condition is generally termed compensatory hypertrophy, and is not necessarily a dilatation at all, as the cavities of the heart may not be enlarged. On the other hand, if the extra work imposed on the heart muscle is beyond its physiological limits, it soon fatigues, loses its tone and begins to dilate and is no longer able to contract against the increased resistance ; consequently the blood is imperfectly passed through the chambers of the heart, and due to its being regurgitated, augments the dilatation and consequently the valvular insufficiency.

In applying the pharmacological action of the drug to the pathological condition generally present in valvular disease, we get the following : The increased contractile power of the muscle tends to increase the systole and decrease the residual blood and consequently increase the output of the heart per beat, thus overcoming the shortenend contractions and increased residual blood and lessened output per beat. Second, the increased irritability of the muscle tends to cause it to go into systole before it reaches the maximum dilatation caused by the blood stasis and fatigue of the muscle, thus lessening the diastolic dilatation, and instead of the heart tending towards a systolic position, thus increasing the frequency of the beat and consequently the output of the heart per unit of time, as shown by the cardiometer.

Therefore, in beginning non-compensatory dilatation of the heart consequent upon valvular disease, digitalis exerts a direct opposite influence to the disease, namely, the working power of the muscle is increased, and consequently physiological hypertrophy, on account of which the muscle is greatly aided in its compensatory efforts and is more quickly brought to a state compatible with the new conditions under which it must functionate.

DISCUSSION.

DR. DANIEL R. BROWER, Chicago: I congratulate internal medicine in getting a little ahead here to-day, and the paper of Dr. Matthews is a valuable contribution in that direction. I think, after a while, we will cause our friends, the surgeons, to take a back seat. I want to make one statement here, and I believe I am correct in doing so, namely, that Dr. Senn was one of the first to demonstrate by experiments, such as Dr. Matthews has detailed to us to-day, that digitalis was not a cardiac depressant, but, as Dr. Butler has remarked, a cardiac stimulant. I noticed in the admirable paper of the doctor that no reference was made to the experiments of Dr. Senn along this line. It may have been an oversight.

DR. GEORGE F. BUTLER, Chicago: I am glad to hear the point brought out by Dr. Brower that digitalis is a cardiac stimulant, different from a cardiac tonic. As a cardiac stimulant, clinically it can be used only in emergencies, or in cases of dynamic failure of the heart muscle, and not before that time. A cardiac tonic, on the other hand, anticipates or antedates cardiac stimulation, and we have such drugs as strychnia, iron, potassium iodide, etc. Digitalis is a drug which is much misused. It is used when a tonic should be employed, and not as a stimulant.

DR. MATTHEWS (closing the discussion): In referring to the criticism of Dr. Butler, he was perfectly right so far as the paper went. If I had had time to have read the whole paper he would have found that I spoke of the clinical application of these pharmacological facts to pathological conditions, but I was unable to read that portion of the paper.

With reference to the remarks of Dr. Brower, one of the first observations made concerning digitalis was away back in 1830, and it was found by experiment that digitalis increased the irritability and contractility of the heart muscle, and only in the later stages of its action did it have a depressing effect. Of course it is poisonous, but it must be given in large doses in order to become such. The only action of any therapeutic value is that it increases the length of the contractions and readily allows the heart muscle to contract.

THE UNTOWARD ACTION OF DRUGS WITH SPECIAL REFERENCE TO HYPNOTICS AND ANTIPYRETICS.

BY GEORGE F. BUTLER, M. D., CHICAGO.

In a paper read before this Society at Decatur in 1894, entitled "Elements of Uncertainty in Therapeutics," I referred to that element of uncertainty residing in what Virchow has termed the "mystery of individuality." Since that time I have devoted a good deal of thought and study to idiopathic idiosyncrasy, as it may well be termed, and the untoward effects of drugs, which is a very important factor in therapeutics.

When I gave the title of my paper to Dr. Edwards, I intended to limit my remarks to the untoward effect of hypnotics and antipyretics, but I found it difficult to do so, and I therefore beg leave to say a few words on the subject in general, submitting for your consideration some tables, which, however, I will not read, but which will be published as a part of this paper. I wish here to acknowledge my indebtedness for much that is of value in this article to Drs. W. L. Baum and J. G. Kiernan, of Chicago, Lewin, of Berlin, Mulheron, of Detroit, and Rivers and Leech, of England.

Drugs given a specified patient, a victim of acquired or inherited defect, will produce in that patient unexpected results differing from their usual action. These results, which should not be classified with typically poisonous effects or with those of prolonged use, may not appear in many cases, and do not correspond, as a rule, with the admittedly

poisonous symptoms. [They have been termed in Germany "Nebenwirkungen," in France "inconvenients therapeutiques," and among the English-speaking nations "untoward effects" and "bye-effects."]

Assuming that a drug be pure and of sufficient potency, any untoward or unusual action following its administration is commonly explained on the supposition that some peculiar molecular arrangement or condition exists in the cells of the body which cannot be recognized either chemically or physically.

We can conceive that certain individuals are isomeric, as it were; that while they may be composed of the same elements that enter into the composition of other persons, yet the elements are joined together in a different way, and such persons are affected by certain drugs in a most peculiar, unexpected, and oftentimes serious manner.

Again, an individual may have in his economy, unknown to himself or to his physician, an excess of certain chemical substances which react in an extraordinarily powerful or rapid manner upon the medicines introduced, causing marked deleterious effects, or perhaps even forming poisonous compounds, as is well illustrated by the untoward results following the administration of calomel to persons who have subsisted for a long time on salted foods, the excess of sodium chloride present in the system converting the mercurous chloride into the mercuric salt, resulting in great gastro-intestinal irritation and other symptoms of mercurial poisoning.

Existing pathologic conditions so severe as to be readily recognized, or so trivial as to pass unnoticed by both patient and physician, may so influence a secretion or function of an organ as to cause unlooked for and even alarming untoward results when a certain drug is given.

An instance of this, familiar perhaps to some of you, is the

action of potassium iodide, which, normally, in its excretion by the mucous membrane of the respiratory tract, gives rise only to very slight catarrhal symptoms, if any noticeable effect at all, but when lesions already exist, as, for instance, syphilitic ulceration of the larynx, has been observed to cause fatal edema of the glottis ; or another example, the tenesmus and bloody stools following the administration of small doses of elaterium or other drastic cathartics, when the intestines are inflamed.

It is, perhaps, unnecessary to refer to certain physiological conditions, such as menstruation, pregnancy, etc., and the influence of time, race and location in determining the action of drugs.

Untoward effects are of great interest from a medico-legal standpoint. Even physicians are but too apt to refer them to defects or impurities in the drug dispensed. Untoward effects are seemingly multiform in character, and yet they can readily be ranged under a few general laws. The primary and secondary effects, which are often opposite in nature, the organs chiefly affected by the ordinary action of the drug, the method of drug-excretion, all play a part in what may be called general constitutional untoward effects, as contrasted with the untoward effects due to temporary and evanescent conditions, which, however, also range themselves in a regulated fashion.

Prediction may be made with considerable accuracy as to the untoward manifestations of any drug on learning its action and all the factors cited. An antipyretic will have as untoward effects skin-eruption: because it is excreted through the skin; because the skin through its pores regulates temperature, and hence is under the control of the central nervous system regulating temperature; and, finally, because the skin is in close connection from an early period with the nervous

system. For the same reason profuse, debilitating perspiration often results. Since control of the temperature cannot be effected without control of the vaso-motor system regulating the blood-supply, heart-failure, collapse and palpitation may result, together with certain eye and ear symptoms. If the drug be one which tends to cause slight brain vaso-motor disturbance, such as results from what is known as a tonic action, then delirium, blindness and deafness of a temporary character are produced.

Temperature in the human subject is regulated by the three systems of nerves: thermotaxic, or heat-regulating; thermo-excitory, or heat-increasing; and thermo-inhibitory, or heat-decreasing. As a more or less exact balance is kept by these centers, undue action of any of them constitutes a morbid state. If the thermo-inhibitory centers be too much stimulated they may lose their control; hence in certain individuals temperature rises after an antipyretic. Hahnemann, an individual with a neurotic constitution, had an easily upset temperature-regulator; the effect on himself of cinchona, therefore, resulted in this phenomenon, which has since been observed by Denk and others from quinine and cinchona preparations.

The action on the heart may by its influence on the kidney-circulation cause kidney and bladder symptoms, even to the extent of albumin in the urine. If the antipyretic be excreted through the kidneys, albuminuria is especially likely to present itself as an untoward result. Alteratives and purgatives produce hemorrhages from the mucous membranes and swelling of those of the organs of special sense, besides skin-eruptions. Hypnotics through their action on the central nervous system produce excessive perspiration, skin-eruptions, vertigo, and heart-collapse. Astringents cause diarrhœa and bloody intestinal discharges. Diaphoretics cause pains at certain points, from over-stimulation.

In classifying tonics and alteratives together in the first table the influences of the trophic nervous system, evident in the constitutional changes produced by diseases like typhoid fever, must be taken into account. Alterative drugs have much the same constitutional effects, according to the theory of their action now coming into general acceptance.

It will be observed from this table that the most potent tonics and alteratives are most fertile in untoward effects. This is naturally to be expected. A drug of potent physiological action must of necessity try more severely inherited and acquired deficiencies of constitution than an inert drug. Too excessive strain on inhibitions weakened by acquired or inherited taint gives an undue sway to inhibited centers.

One influence which together with hereditary or acquired defect plays a part in determining untoward results, is what the Germans call the etiologic moment. This is excellently illustrated in the neurotics, which display such decidedly variable untoward effects. In many neuroses nerve strain of the eliminative and assimilative organs has produced toxins and other products ; some of these naturally add to the effects of a given neurotic drug or direct these in some special channel or inhibit certain effects, thereby giving others undue play. This may constitute, as Lewin has shown, a disposition that is but temporary, which disposition may have its foundation either in a greater abundance in the system of bio-chemical substances—which cause an unusually prompt solution or action of the medicine introduced, or which may unite with them to form injurious compounds—or it may be conditional on pre-existing pathologic changes in the inhibitory apparatus of the system.

Untoward effects of drugs may hence be conditioned on pre-existing affections of the inhibitory apparatus of the system.

The annexed tables [pages 193–198] covering all the departments of the materia medica, will give a better idea of these untoward effects than any detailed description.

DISCUSSION.

Dr. A. C. Cotton, Chicago: *Mr. President*—I am glad Dr. Butler has read this paper, and that he did so under the title mentioned. I think we ought to have more papers and discussions along that line. I believe that if we could have at the meetings of our medical societies discussions relating to the physiological action of drugs, we would soon relegate their untoward action to the past as we have relegated the misnomer—idiosyncrasy. I remember very well meeting a physician in consultation a few years ago who spoke of the idiosyncrasy which a certain patient exhibited towards morphine. He had discovered her idiosyncrasy against that drug was markedly increased after she had a good bowel movement. He said another physician had told him, in relating his experience, that he had found cinchonism developed much more rapidly after a laxative or cathartic than when none had been administered before the quinine; and so on along down the line the physician occasionally stumbles upon some relationship between the so-called untoward action of drugs or idiosyncrasy and the condition of the patient and usually there is some relation between the pathological condition and the physiological action of the drug. A medical student is too apt to be led to think that he can learn therapeutics from text-books, and when he begins to practice, that he has some authorities back of him for his therapy. The observing practitioner, however, soon finds out that authorities are in error, and he often takes refuge in the comforting idea of idiosyncrasy or of untoward action. I believe Dr. Butler will agree with me when I say that the time is coming when we must insist that medication shall be directed specifically to the individual case in hand. Each medical student should be taught to believe that there is no authority when it comes to the administration of drugs in individual cases, and that *he* is the authority with his patient, concerning whom he is studying the indications for therapeutic treatment.

I am glad that Dr. Butler has sounded the key-note, and believe that the time is coming when each case will be studied according to its special indications, and when practitioners will not take refuge in the "untoward action of drugs."

TABLE I.—ALTERATIVES AND TONICS.

	General.	Brain and Cord.	Eye, Ear and Throat.	Skin.	Liver, Kidneys and Bladder.
Arsenic - - - - -	Fever, gastralgia, nausea, bulimia, salivation, profuse sweating, diarrhea, purpura.	Vertigo, ataxic symptoms, local anesthesia.	Eyelid edema, glottis edema, catarrh, amblyopia, tinnitus.	Vesicles, pustules, papules, erythema, urticaria, purpura.	Dysuria, icterus, hematuria, glycosuria, cystitis, albuminuria.
Chelidonium - - -	Nausea.	Vertigo.	Tinnitus.	Pruritus.	Albuminuria.
Cod-liver Oil - - -	Nausea.	Vertigo.		Vesicles.	
Colchicum - - - -	Nausea, gastralgia, like guaiac.	Like guaiac.	Like guaiac.	Vesicles.	Cystitis, strangury.
Columbo - - - -	Fever.	Vertigo, contractions.	Conjunctivitis, tinnitus.	Erythema.	Dysuria.
Cresole - - - - -	Fever, nausea.	Vertigo.	Eyelid edema, tinnitus.	Erythema, papules.	Cystitis.
Gold - - - - - -	Fever, salivation, epistaxis.	Vertigo, emotional exaltation, aphrodisia.	Tinnitus.	Erythema, papules.	Cystitis.
Guaiac - - - - -	Fever, profuse sweating.	Vertigo, ataxic symptoms, neuralgia.	Glottis edema, tinnitus.	Vesicles.	Cystitis, strangury.
Iodine - - - - -	Bulimia, gastralgia, cardiac disorder, hemoptysis, dyspnea, fever, epistaxis, nausea.	Aphrodisia, ataxic symptoms, vertigo, delirium.	Amblyopia, catarrh, glottis edema, eyelid edema, diplopia, tinnitus, salivation.	Erythema, vesicles, papules, pustules, purpuric eruptions, urticaria.	Dysuria, cystitis, glycosuria, albuminuria.
Iron - - - - - -	Hemoptysis, hematemesis, nausea, gastralgia, fever, diarrea, constipation.	Vertigo, ataxic symptoms, insomnia.	Eyelid edema, glottis edema, amblyopia, tinnitus.	Vesicles, purpuric eruptions, pustules.	Hematuria, albuminuria, glycosuria, icterus.
Mercury - - - -	Fever, gastralgia, diarrhea, constipation, bulimia.	Insomnia, ataxic symptoms, insanity, local sensory troubles.	Eyelid edema, amblyopia, tinnitus, glottis edema.	Like iodides and quinine, tongue ulceration, salivation.	Dysuria, cystitis, hematuria, glycosuria.
Quassia - - - -	Nausea.	Vertigo, contractions.	Tinnitus.	Papules.	Dysuria.
Quinine - - - -	Fever, nausea, bulimia, hemoptysis, profuse sweating, dyspnea.	Delirium, insanity, ataxic symptoms, local sensory troubles, vertigo.	Amblyopia, photophobia, deafness, tinnitus.	Simulates scarlet fever, vesicles, papules, pustules, erythema, urticaria, purpura.	Hematuria, cystitis, albuminuria, glycosuria, icterus.
Salicylic Acid - -	Profuse perspiration, bulimia, hemoptysis.	Vertigo, delirium, insanity, ataxic symptoms, local sensory troubles.	Dim sight, deafness, tinnitus.	Vesicles, pustules, pruritus, gangrene, purpura.	Cystitis, glycosuria, icterus.
Sarsaparilla.	Nausea, gastralgia, bulimia, profuse sweat.	Vertigo, ataxic symptoms.	Glottis edema, tinnitus.	Eczema.	Cystitis, strangury.

TABLE I.—ALTERATIVES AND TONICS. (*Concluded.*)

	GENERAL.	BRAIN AND CORD.	EYE, EAR AND THROAT.	SKIN.	LIVER, KIDNEYS AND BLADDER.
Strynhnine - - -	Fever, dyspnea.	Vertigo, ataxic symptoms, local sensory troubles.	Conjunctivitis, photophobia, tinnitus.	Erythema, pruritus.	Albuminuria, glycosuria, cystitis.
Turpentine - - -	Fcver, nausea.	Vertigo, drowsiness, stupor.	Tinnitus.	Vesicles, erythema.	Albuminuria. cystitis, strangury, hematuria.

TABLE II.—NEUROTICS, NARCOTICS, ANTIPYRETICS AND HYPNOTICS.

	GENERAL, LUNGS AND HEART.	BRAIN AND CORD.	EYE, EAR AND THROAT.	SKIN.	LIVER, KIDNEYS AND BLADDER.
Acetanilid or Antifebrin - - - - -	Cardiac failure. lung edema, cyanosis, fever, pallor, hyperidrosis, nausea, diarrhea.	Anesthesia, hyperesthesia, vertigo, delirium, stupor, ataxia.	Amblyopia, xerostoma, throat constriction, tinnitus, pupil irregularity, conjunctivitis.	Erythema, vesicles, papules.	Icterus, dysuria. cystitis, albuminuria glycosuria.
Aconite - - - -	Nausea, diarrhea, salivation, hyperidrosis, collapse, cyanosis.	Vertigo, anesthesia, paresthesia, hyperesthesia.	Amblyopia, tinnitus, xerostoma.	Erythema, urticaria.	Icterus, polyuria.
Amyl Nitrite - - -	Like glonoin.	Like glonoin.	Like glonoin.	Like glonoin.	Like glonoin.
Antikamnia - - -	Like acetanilid.	Like acetanilid.	Like acetanilid.	Like acetanilid.	Like acetanilid.
Antipyrin - - - -	Like acetanilid.	Like acetanilid.	Like acetanilid.	Like acetanilid.	Like acetanilid. cystalgia.
Arnica - - - - -	Tenesmus, bradycardia, diarrhea, collapse.	Stupor, vertigo, headache.	Xerostoma. amblyopia, throat irritability.	Erythema, urticaria, papules, pruritus.	Cystalgia, dysuria.
Atropine - - - -	Like belladonna.	Like belladonna.	Like belladonna.	Like belladonna.	Like belladonna.
Belladonna - - -	Diarrhea, nausea, vomiting, collapse, hyperidrosis, fever, cardiac pain, dysphagia, dyspnea.	Delirium, insanity, stupor, vertigo, ataxia.	Amblyopia, lachrymation. xerostoma, tinnitus.	Erythema. vesicles, papules, purpura, pruritus.	Cystalgia, dysuria, polyuria.

TABLE II —NEUROTICS, NARCOTICS, ANTIPYRETICS AND HYPNOTICS. (*Continued.*)

	General. Lungs and Heart.	Brain and Cord.	Eye, Ear and Throat.	Skin.	Liver, Kidneys and Bladder.
Bromides - - - -	Collapse, cardiac failure, lung edema, gastralgia, vomiting, aphrodisia, amenorrhea, pneumonia.	Delirium, insanity, stupor, ataxia, convulsions, anesthesia, hyperesthesia.	Throat anesthesia, coryza, laryngismus stridulus, conjunctivitis, amblyopia, myopia, diplopia, fetid breath.	Acne, papules, vesicles, urticaria, erythema, pruritus.	Dysuria, cystalgia, icterus, polyuria, glycosuria.
Caffeine - - - -	Bradycardia.	Delirium, insanity.	Diplopia.	Erythema, vesicles.	Dysuria,
Camphor - - - -	Diarrhea, collapse, aphrodisia, hyperidrosis, vomiting.	Delirium, insanity, stupor, hyperesthesia, headache.	Xerostoma, coryza, amblyopia, tinnitus.	Erythema, vesicles.	Dysuria, polyuria, cystalgia, strangury.
Cannabis Indica -	Aphrodisia, vomiting, diarrhea, amenorrhea.	Vertigo, delirium, insanity, ataxia.	Amblyopia, tinnitus.	Erythema, vesicles.	Dysuria, cystalgia.
Chloralamid - - -	Like chloral.	Like chloral.	Like chloral.	Like chloral.	Like chloral.
Chloralose - - -	Like chloral.	Like chloral.	Like chloral.	Like chloral.	Like chloral.
Chloral Hydrate -	Dyspnea, lung edema, heart failure, fever, diarrhea, hyperidrosis, bradycardia.	Vertigo, ataxia, stupor, delirium, convulsions, analgesia, anesthesia, hyperesthesia.	Epiglottis edema, amblyopia, photophobia, conjunctivitis, chloroiditis, tinnitus.	Erythema, acne, purpura, papules, urticaria, pruritus.	Icterus, dysuria, strangury, glycosuria, albuminuria.
Chloroform - - -	Fever, collapse, aphrodisia, diarrhea, hyperidrosis.	Vertigo, delirium, ataxia.	Amblyopia, like chloral.	Like chloral.	Like chloral.
Cocaine - - - -	Anaphrodisia, collapse, diarrhea, constipation, nausea, fever, amenorrhea, tenesmus.	Vertigo, ataxia, hyperesthesia, delirium, insanity.	Like opium.	Like opium.	Icterus, strangury, dysuria, polyuria.
Codeine - - - -	See Opium.				
Conium - - - -	Nausea, vomiting, bradycardia.	Ataxia, stupor, hyperesthesia.	Amblyopia.	Erythema.	Dysuria, polyuria.
Digitalis - - - -	Cardiac failure, dyspnea, dysphagia, nausea.	Headache, vertigo, stupor, insanity, ataxia.	Amblyopia.	Erythema	Dysuria, polyuria, strangury, glycosuria.
Duboisine - - - -	See Belladonna.				
Ergot - - - - -	Nausea, vomiting, gastralgia, bradycardia, fever, cyanosis.	Convulsions, vertigo, ataxia, hyperesthesia, delirium, insanity.	Amblyopia, tinnitus, photophobia.	Erythema, papules, urticaria.	Icterus, glycosuria strangury.

TABLE II.—NEUROTICS, NARCOTICS, ANTIPYRETICS AND HYPNOTICS. (*Continued.*)

	General. Lungs and Heart.	Brain and Cord.	Eye, Ear and Throat.	Skin.	Liver, Kidneys and Bladder.
Ether	Pallor, cyanosis.	Vertigo, delirium.	Salivation, laryngismus stridulus, amblyopia, tinnitus.	Erythema, urticaria,	Icterus, glycosuria.
Exalgin	Like phenacetin.	Like phenacetin.	Like phenacetin.	Like phenacetin.	Like phenacetin.
Gelsemium	Dyspnea, coryza.	Vertigo.	Amblyopia.	Erythema.	Strangury, icterus.
Glonoin	Dyspnea, coryza.	Vertigo, ataxia, analgesia.	Amblyopia.	Erythema.	Stranguary, glycosuria.
Holocaine	Like belladonna.	Like belladonna.	Like belladonna.	Like belladonna.	Like belladonna.
Homatropine	Like belladonna.	Like belladonna.	Like belladonna.	Like belladohna.	Like belladonna.
Hydracetin	Fever, nausea, cardiac irritability, dyspnea, nausea.	Vertigo, dilirium, ataxia, numbness.	Pupil immobility, amblyopia, conjunctivitis, throat irritability.	Erythema, purpura.	Strangury, hematuria.
Hyoscyamus, Hyoscyamine, Hyoscine	Like hydracetin.	Like hydracetin.	Like hyracetin.	Erythema, papules and pustules.	Icterus, bladder-irritability.
Kryofine	Dyspnea, coryza, hyperidrosis.	Like hydracetin, except as to delirium.	Amblyopia.	Erythema.	Polyuria, dysuria.
Methylal	Like kryofine.	Like hydracetin, stupor.	Diplopia, amblyopia.	Erythema, urticaria.	Polyuria, bladder irritability.
Methacetin	Hyperidrosis, like hydracetin.	Like hydracetin.	Amblyopia, diplopia.	Erythema.	Like methylal.
Monobromacetanilid	Fever, syncope, hyperidrosis, cyanosis.	Vertigo, stupor, headache, numbness, hyperisthesia.	Amblyopia.	Erythema	Like methylal.
Musk	Nausea, aphrodisia, fever.	Like monobromacetanilid.	Throat irritability, amblyopia.	Erythema.	Dysuria.
Opium, Morphine, Codeine	Nausea, diarrhea, gastralgia, dyspnea, aphrodisia, fever, hyperidrosis.	Vertigo, stupor, convulsions, insanity, headache, paresthesia.	Throat irritability, amblyopia, yellow vision, accommodation spasm.	Erythema, vesicles, papules, purpura, pruritis, urticaria.	Dysuria, glycosuria, icterus.
Paraldehyde	Like opium, cyanosis, gastralgia.	Like opium.	Like opium.	Like opium.	Like opium.
Pental	Like ether.	Like ether.	Like ether.	Like ether.	Like ether.
Phenacetin	Fever, collapse, dyspnea, hyperidrosis, cyanosis,	Vertigo, ataxia, stupor, hyperesthesia.	Amblyopia, tinnitus, diplopia.	Erythema, urticaria.	Dysuria, glycosuria, icterus.
Phenocol	Like phenacetin.	Like phenacetin.	Like phenacetin.	Like phenacetin.	Like phenacetin.
Physostigma	Nausea, gastralgia, vomiting.	Vertigo, mastalgia, delirium, ataxia.	Tinnitus, amblyopia.	Pruritis, erythema, urticaria.	Dysuria, icterus.

TABLE II.—NEUROTICS, NARCOTICS, ANTIPYRETICS AND HYPNOTICS. (*Concluded.*)

	General. Lungs and Heart.	Brain and Cord.	Eye, Ear and Throat.	Skin.	Liver, Kidneys and Bladder.
Phytolacca	Like physostigmin.	Like physostigmin.	Like physostigmin.	Like physostigmin.	Dysuria.
Pulsatilla	Coryza, dyspnea, cardiac irritability.	Orchialgia, mastalgia.	Amblyopia, eye-pain, tinnitus.	Erythema.	Dysuria, polyuria.
Scopolamine	Like belladonna.	Like belladonna.	Like belladonna.	Like belladonna.	Like belladonna.
Serosin	Like methacetin.	Like methacetin.	Like phenacetin.	Like phenacetin.	Like phenacetin.
Stramonium	Like belladonna.	Like belladonna.	Like belladonna.	Like belladonna.	Like belladonna.
Sulphonal	Like methacetin.	Like methacetin.	Like methacetin.	Like methacetin.	Like methacetin.
Tetronal / Trional	Like methacetin.	Like methacetin.	Like methacetin.	Like methacetin.	Like methacetin.
Valerian	Nausea, diarrhea, aphrodisia, enteralgia, gastralgia.	Paresthesia, vertigo, delirium.	Throat constriction, tinnitus, amblyopia.	Pruritus, erythema, papules.	Dysuria, polyuria.
Veratrum	Collapse, dyspnea, cardiac pain, enteralgia, gastralgia.	Paresthesia, hyperesthesia, vertigo, convulsions, delirium.	Xerostoma, amblyopia.	Pruritus, petechiæ.	Dysuria.

TABLE III.—ANTHELMINTICS, CATHARTICS, DIAPHORETICS, DIURETICS, EMETICS, EXPECTORANTS.

	General. Lungs and Heart.	Brain and Cord.	Eye, Ear and Throat.	Skin.	Liver, Kidneys and Bladder.
Aloes	Vomiting, tenesmus.	Ataxia, vertigo.	Amblyopia.	Erythema, urticaria.	Hematuria.
Ammonium Chloride	Nausea, diarrhea.	Ataxia, vertigo.	Amblyopia.	Erythema.	Polyuria.
Buckthorn	Fever, diarrhea.	Ataxia, vertigo.	Amblyopia, tinnitus.	Erythema.	Icterus, polyuria.
Cascara	Like buckthorn.	Like buckthorn.	Like buckthorn.	Like buckthorn.	Like buckthorn.
Castor Oil	Vomiting, fever.	Like buckthorn.	Like buckthorn.	Like buckthorn.	Icterus.
Colocynth	Like castor oil.	Like buckthorn.	Like buckthorn.	Pruritus, erythema.	Icterus.
Copaiba	Fever, dyspnea, gastralgia, nausea, aphrodisia.	Vertigo, ataxia, spastic palsy.	Amblyopia, photophobia, conjunctivitis, pharyngitis, tinnitus.	Roseola, urticaria, erythema, pruritus, penis ulcers.	Cystitis, nephritis, dysuria.
Croton Oil	Nausea.	Vertigo.	Amblyopia, conjunctivitis.	Erythema.	Icterus, cystitis, nephritis.
Cubebs	See Copaiba.				
Elaterium	See Colocynth.	See Colocynth.			
Gamboge	See Colocynth.				
Gratiola	Aphrodisia, vomiting.	See Colocynth.			

TABLE III.—ANTHELMINTICS, CATHARTICS, DIAPHORETICS, DIURETICS, EMETICS, EXPECTORANTS. (*Con'd.*)

	General. Lung and Heart.	Brain and Cord.	Eye, Ear and Throat.	Skin.	Liver, Kidneys and Bladder.
Ipecc - - - - - -	Diarrhea.	Vertigo.	Amblyopia, tinnitus, salivation.	Pruritus, erythema.	Dysuria.
Iris - - - - - - -	See Colocynth.				
Jaborandi - - - -	Nausea, collapse, fever, lung edema.	Vertigo, ataxia, penis-tip pain.	Amblyopia, tinnitus.	Erythema, pruritus.	Icterus, dysuria, polyuria.
Jalap - - - - - -	See Colocynth.				
Male Fern - - - -	Nausea, fever.	Vertigo, ataxia.	Amblyopia, tinnitus.	Erythema, roseola.	Dysuria, cystalgia.
Podophyllum - - -	See Colocynth.				
Pomegranate - -	Nausea, diarrhea.	Vertigo, ataxia.	Amblyopia, tinnitus.	Erythema.	Polyuria.
Pot. Chlorate - -	Nausea, diarrhea, fever.	Vertigo, delirium, ataxia.	Amblyopia, coryza, epistaxis.	Roseola, erythema.	Nephritis, icterus, cystitis, dysuria.
Rhubarb - - - - -	Nausea, vomiting, constipation, penis hemorrhage.	Vertigo, ataxia.	Amblyopia, coryza, tinnitus.	Roseola, macules, erythema, urticaria.	Hematuria, dysuria.
Rhus - - - - - - -	Nausea.	Vertigo, delirium, ataxia.	Amblyopia, deafness, tinnitus.	Macules, erythema.	Dysuria, cystitis.
Santonin - - - - -	Nausea, diarrhea, gastralgia, amenorrhea.	Vertigo, ataxia, insanity, delirium.	Amblyopia, photophbia, yellow vision, tinnitus.	Erythema, urticaria.	Icterus, dysuria.
Senega - - - - - -	Nausea, diarrhea, gastralgia.	Vertigo.	Amblyopia.	Erythema.	Dysuria.
Squills - - - - - -	Like senega.	Like senega.	Xerostoma, amblyopia, coryza, tinnitus.	Erythema.	Dysuria, hematuria.
Tartar Emetic - -	Nausea, cyanosis, collapse.	Vertigo.	Amblyopia, conjunctivitis.	Roseola, papules.	Nephritis, cystitis, dysuria.

STREPTOCOCCAL INFECTION.

BY GEO. W. COX, M. D., CHICAGO.

As the study of bacteriology and allied sciences becomes more and more a part of the great system of medical learning, the physician is brought to a realizing sense of the vastness of the field that is being gradually opened up before him. Microbes, bacilli and spirilla galore are being discovered, re-discovered, cultivated, bred, nurtured, starved, killed and dissected by inquisitive minds and cunning hands all over the world. All classes of practitioners—surgeons, physicians, obstetricians and specialists in every line would find their occupations of but limited interest if they should be suddenly deprived of the bacteriologist's skill and aid. Modern surgery could no more exist without a "microbe killer" than it could without a scalpel or ligature; and indeed both of these surgical necessities depend upon the germ destroyer for a large part of their usefulness. Our surgical friend of to-day feels himself utterly disgraced if a drop of pus is found lurking about the stump after a hip-joint amputation, while the gynecologist would seek a Pool of Siloam in which to cleanse himself if one of his vaginal hysterectomies should be polluted by a "stitchhole abscess." The obstetrician has a similar and laudable pride in his work. He has two human lives at stake, a number of accidents to avoid and several diseases to prevent. He is proud of the responsibility, and his boast is that in a four years' practice he never saw a case of ophthalmia neonatorum or puerperal septicemia. He knows these

things exist only by hearsay; he knows they are the result of uncleanliness; he knows that they can always be prevented—and he will keep right on knowing it until one or more cases drop in on him in an unguarded moment, or as the result of some unavoidable accident. There is some balm in Gilead, however, so far as the septicemia is concerned, for all are aware that this condition in the parturient woman is generally due to streptococcal infection, and all have heard of the wonderful cures that have been effected in such cases by the free employment of streptococcus antitoxin—or, more strictly speaking, antistreptococcic serum. In other channels of special practice, too, we find the little chain microbe a factor of very considerable importance. The ophthalmologist, the otologist and the rhinologist all find it a busy and troublesome invader; the specialist in throat and lung diseases regards it as his greatest enemy; the dermatologist looks upon it as a sort of sneak-thief—annoying, but easily frightened away—and I am not sure but it is beginning to be suspected by the chiropodist and the tape-worm doctor. In brief, nearly everybody who has taken the trouble to look for streptococcal infection has found it, thus proving its widespread range, and leaving the inference, which we might call a certainty, that it exists in thousands of cases where it is not even suspected. If the streptococcus germ were as innocent and innocuous as many others that we could name, or if its habits were regular, so we could always know what to expect from its presence, we would not attach so much importance to its invasion. But this is far from being the case. Treachery of the blackest type is the one characteristic that marks this germ for our special displeasure, and makes for it a class all its own. So far as known, no other one germ will cause so many different diseases, none so variable in its pathogenic effects, and surely no other germ is found associated with other micro-organisms

with anything like the frequency of this one. Thus streptococcal infection may be said to be the most frequent and the most troublesome complicator of diseases that is known to have its origin in the bacterial field. The nature of these complications is as diverse as the diseases in which they are found; and no one can appreciate their importance who has not had some personal experience in dealing with them.

THE MICROBE.

The streptococcus microbe need scarcely occupy our time in a detailed morphologic description, for its form and general characteristics are quite familiar to us all; and it is only for the purpose of simplifying the study of its pathogenic effects that mention is made of it in this connection.

In June, 1897, I had the honor of presenting a paper on Streptococcal Infection to the Section on Materia Medica, Pharmacy and Therapeutics at the annual meeting of the American Medical Association in Philadelphia. In this paper I expressed a belief in the unity of the streptococcus microbe, giving my reasons therefor, and citing a number of the world's best authorities in support of the position. Subsequent study of the subject has only served to strengthen the opinion then held—the evidence seeming wholly inadequate to justify the rather arbitrary splitting up of the streptococcus into fifteen or sixteen different classes or species. Von Lingelsheim (1891) tried to simplify the classification of this germ by dividing it into two great groups, but admitting that it was impossible to distinguish these one from the other except under certain conditions and by the use of certain kinds of culture media. Both Knorr (1893) and Waldvogel (1894) proved the little value of Lingelsheim's classification by showing that great changes in biologic character and pathogenic power constantly resulted from cultivation in special media, as

well as from repeated inoculations into different kinds of animals—the results being diametrically opposite in many instances. This fact was further attested by the experiments of Traversa and Manfredi, whose injections into various animals sometimes resulted in convulsions and sometimes in paralysis.

In regard to the cultivation of this germ we also find frequent clashings of testimony. Fehleisen, the discoverer of the so-called streptococcus erysipelatos (1883), and De Simone, both declare that it thrives upon the surface of cooked potato, while a whole army of investigators, headed by Baumgarten, Flügge and Fränkel, assure us that absolutely no growth occurs upon this medium. Amid such bewildering conflictions as these and many others equally positive and confusing, what are we to believe concerning the streptococcus?

The writer prefers to believe with Marmorek, Koch, Widal and others, whose investigations have been productive of tangible results instead of visionary theories, that wherever we find micrococci associated in chains of any length—straight, curved or in loops—virulent or benign—they are streptococci pure and simple, and the offspring of a single parent microbe.

DISEASES CAUSED BY THE STREPTOCOCCUS.

It is altogether probable that the brief list of diseases now generally conceded to be the direct result of streptococcal infection will eventually be materially augmented, while that comprising those in which it is now supposed to be only a complication will be correspondingly curtailed. This reasoning is the result of a careful study of the behavior of the diseases themselves under the influence of the specific germicide of this microbe.

Puerperal Septicemia is by far the most fatal, and therefore the most dreaded disease that has the streptococcus for a cause, and it should therefore receive the most prompt and painstaking treatment at our hands. It must be remembered, however, that a few (about 20 per cent.) of the cases of puerperal septicemia exist independently of streptococcal infection —the gonococcus, the staphylococcus and the bacillus coli communis each being held responsible for a limited number. It is impossible to diagnosticate these without a bacteriologic examination, as the subjective and objective symptoms, as well as the general appearances, are about the same in all. I may add as a consolatory assurance that the greater number —those due to streptococcal infection—are easily and quickly controlled by appropriate treatment, while the others usually resist all the measures at our command.

Erysipelas, while not a very fatal disease, is an extremely annoying one, and in some instances a very loathsome one. Among the older practitioners before me there are doubtless a few who have had some experience in mixing erysipelas with parturition. If so, they will readily agree with me that this form of streptococcal infection is one of the most lamentable that could be imagined. Until within a very recent date such a condition was considered well nigh hopeless; but thanks to the gradual development of serum therapy, even this obstetric terror has been robbed of its most dreaded features. With proper management it is now rarely fatal.

Phlegmon, in its various phases, is frequently a source of great annoyance to the physician, and always of great discomfort to the patient. Its etiology and pathology being now well understood, however, it has likewise dropped into the ranks of preventable and curable maladies, often without the intervention of lancet or poultice.

The complications caused by streptococcal infection are so

numerous, so complex in their nature and so variable in their results that but few of those most frequently met with will be considered in this thesis. It has already been pointed out—in my former paper above alluded to—that the streptococcus varies in its pathogenic effects from an apparently harmless presence to the most virulent form of tissue destruction. This is accounted for, not upon the supposition that there are a large number of kinds or species of the microbe itself, but upon the conditions under which it is found, such as locality, temperature, humidity, general health of the tissues involved, whether alone or associated with other micro-organisms, etc. Streptococcus microbes may exist in and about the natural orifices of the body in immense numbers, and for a great length of time, with no apparent inconvenience to a healthy child; but once let that child be striken with an infectious or zymotic disease and the condition is quickly changed. The weakening of the tissues or the stimulus of the new invasion causes the previously innocent germs to spring into such baneful activity that fatal results might speedily follow unless checked by prompt and vigorous treatment. So I would again recommend—and in the light of further study of the habits of this germ, more earnestly recommend—that whenever and wherever the streptococcus is found, whether in health or disease, whether alone or associated with other micro-organisms, that immediate and decisive steps be taken for its destruction.

Diphtheria, that terribly fatal disease of childhood, is frequently complicated with streptococcal infection; and while we feel such a great degree of security in the possession of a pure antitoxin for its special treatment, yet in spite of this a few of these cases go on to a fatal termination. A very large percentage, if not all, of these fatal cases would reveal mixed infection if the proper tests were applied; and statistics are

not wanting to prove the great value of attention to the complicating factor.

Scarlatina. Streptococcal invasion has so often been found in this disease as to lead to the conclusion that it is invariably present. This would indicate that the germs show a somewhat fastidious taste in the selection of associates, or at least that they thrive better in tissues already weakened by the action of certain species of other bacteria. Clinical evidence is produced in abundance to show that where an antistreptococcic treatment is resorted to early in the course of the disease the cases are rendered milder and more responsive to other measures. This is probably due in part to prevention of the kidney involvement that so frequently accompanies or follows this disease, and which is doubtless the result of septic infection.

Tuberculosis. A plain case of simple and uncomplicated tuberculosis is rarely met with; but when one is seen, it is about as easily managed, and as surely curable, as any of the subacute or chronic affections that attack the human race. A few observers have even claimed that such cases are self limited under favorable hygienic conditions, and that death is always the result of complicating influences in the tuberculous subject. However this may be, the writer has indubitable proof that when such cases are once rid of their complications they assume a much more favorable aspect, some of them going on to apparently complete recovery. It must not be inferred from this assurance that a belief is implied in the curability of tuberculosis—especially of the pulmonary variety—when it has progressed beyond certain limits. If the destruction of lung tissue is very great I have but little faith in the reparative power of nature to overcome the loss, notwithstanding the fact that cavities of considerable size do sometimes cicatrize. But even in such cases, where hope of

ultimate recovery is beyond all reason, much comfort may be afforded to the patient, and many months, or even years, added to the lease of life by converting the case as nearly as possible into one of simple tuberculosis. This is not a visionary theory, evolved in the realms of hopeful imagination, but it is an assured fact, as shown by records from the case-books of reputable medical men.

In addition to these three diseases, in which the prognosis so frequently depends upon prompt elimination of the complicating influences, streptococcal invasion is more or less constant in measles, bronchitis, broncho-pneumonia, otitis, appendicitis, endocarditis, adenitis, cellulitis, peritonitis and many others. In all such conditions the disease is greatly modified, the treatment simplified and recovery materially hastened by first treating the complication. It has been my good fortune to see this demonstrated a number of times during the last two years in cases of pulmonary tuberculosis. Some of these were obstinately resistant of anti-tubercular treatment while the streptococcal infection remained; but after suspension for two or three weeks to allow this complication to be eliminated, the former treatment was resumed with excellent results.

Incredulity seems to be one of the reigning features in the medical mind. This is not to be wondered at when we consider the vast number of fanciful theories and worthless nostrums that are constantly being urged upon us for consideration and trial.

It requires, and justly so, a considerable amount of demonstration to convince the average practitioner of the value of a new theory or a new remedy. If a new idea be enunciated, a few will gulp it down and adopt it without question; many more will try it in a half-hearted and suspicious sort of a way, while the great majority will either openly revolt or play the

doubting Thomas until forced into acceptance by overwhelming proof. In the domain of serum therapy this has been especially noticed, a single failure being allowed to overbalance a large number of brilliant successes. A single sudden death occurring after the administration of diphtheria antitoxin (and for which the antitoxin was in no way responsible) has caused more comment by the laity, the lay press and the professional "Thomases" than the saving of a hundred lives by the same means. So, too, we hear of occasional failures of the anti-streptococcic serum to accomplish its mission. The reason for this is quite apparent when we analyze a few cases of the so-called failures. As a type of these reports it will be sufficient to mention one that recently appeared in one of the eastern medical journals. The case was reported by a well-known western physician whose ability and integrity are well established, and who enjoys the reputation of being scrupulously careful and painstaking in his work. It was a case of puerperal septicemia following abortion at the fourth month of gestation. The physician was not called until nine days after the expulsion of the fœtus, when he was summoned to attend to the delivery of the placenta, which had been retained all this time. Another nine days elapsed before the doctor saw the patient again, when he "found her with a temperature of 105 degrees F., a pulse of 120, and the other typical symptoms of puerperal infection." For four days he treated the case by the usual methods—curettage, alcohol, quinine, etc.—with no apparent benefit. On the twenty-third day after the delivery of the fœtus he used ten cubic centimeters of antistreptococcic serum, and after an interval of two days he administered a similar dose, which completed the serum treatment in this case. The patient died and the physician reported it under the following title: *"A Case of Puerperal Septicemia Unsuccessfully Treated by Antistreptococcus Serum."*

Why such a conspicuous and misleading head-line should have been chosen for this report it would be difficult to say. In the first place, it must be remembered that the antistreptococcic serum is only recommended for streptococcal infection. Marmorek himself has pointed out that it has no effect whatever upon other conditions than this, and the writer has accentuated and emphasized this point upon every possible occasion during the last two years. In the report just alluded to there is no mention of any bacteriologic examination having been made, and it is fair to infer that none was made; hence we do not know whether or not it was a proper case for the serum treatment. Granted, however, that the proper test was applied and the diagnosis of streptococcal infection made, the employment of the serum in the doses mentioned by the reporter was wholly inadequate, and nothing but failure could reasonably be expected. Twenty cubic centimeters in such a case would be about equivalent to using two hundred or three hundred units of antitoxin in a case of malignant diphtheria. Owing to the paucity of authorities I may be pardoned for making a brief quotation from my former paper in regard to dosage, as follows: "In all grave cases, such as puerperal septicemia, and especially if treatment has been considerably delayed, an initial dose of 30 cc is advised. This may be followed by doses of 10 cc or 20 cc every twelve or twenty-four hours, according as the symptoms are affected." If streptococci were present at all in the case above mentioned, they were present in vast numbers at the time the serum was first used, and correspondingly large doses were indicated. I should say that 70 cc should have been administered during the first twenty four hours, and 40 cc each subsequent twenty-four hours until the condition of the patient was decidedly improved. If this dosage seems excessive to any of you, it is only necessary to remind you that Marmorek's serum, like

all of those prepared at the Pasteur Laboratories in France, is free from all extraneous substances, such as antiseptics and so-called preservatives, and there is practically no limit to the quantity that may be injected with safety. I have dwelt upon the details of this case for the purpose of demonstrating what is meant by "inadequate dosage," and to show how a most excellent remedy might be brought into disrepute, if not absolute ridicule, by being carelessly used or improperly reported.

CASES.

It is not my purpose to consume time in giving the details of a large number of cases which must necessarily partake of the nature of repetition, but instead I have selected a single case out of a number occurring in a variety of diseases in which streptococcal infection was present in a more or less severe form.

CASE I. *Erysipelas twice aborted in the same subject.* Miss A. S., teacher, aged 31 years, has had attacks of facial erysipelas at frequent intervals for seventeen years. Without exception, until the serum treatment was resorted to, less than two years ago, these attacks were of such severity as to swell the features beyond recognition and confine the patient to the house for periods ranging from one to three weeks—even endangering life on more than one occasion. Early in the autumn of 1896 I was called upon to give her the serum treatment—the classic premonitory symptoms having appeared and the well-known erysipelatous blotch occupying the usual site upon the right cheek. Time, Friday noon. Twenty cubic centimeters of Marmorek's serum were injected at once, and twenty-four hours later a dose of 10 cc was given.

On the following Monday forenoon the patient remained at home from choice, but in the afternoon she resumed her duties in the school room, apparently in perfect condition. Within a year another attack was warded off by a single dose

(20 cc) of the same serum. When about to leave for her summer vacation last August, this patient prescribed an immunizing dose of Marmorek's serum for herself, and insisted upon my administering it, which I did, though not quite clear as to the propriety of so doing. No inconvenience was experienced from the injection, however, and no indications of a return of the disease have been noticed up to the present time.

CASE 2. *Erysipelas cured.* Mrs. S., aged 27, gave a history very similar to the one just described—oft-recurring facial erysipelas since about the age of puberty. Had a severe attack about one week previous to an expected confinement. When I was called the disease was well advanced, the symptoms severe and accompanied by strong uterine contractions. Vigorous treatment was instituted—60 cc of Marmorek's serum being injected during the first twenty-four hours. At the end of this time the erysipelatous condition was decidedly improved and rapidly subsiding. The uterine contractions were controlled by the usual anodyne and sedative remedies and the patient made a rapid recovery. At the end of a fortnight she gave birth to a 10-pound boy which was followed by a convalescence and perfect restoration to health without incident worthy of mention. In this case it must be admitted that both the curative and immunizing properties of the Marmorek serum are beautifully shown.

CASE 3. *Diphtheria with mixed infection.* This was a little colored girl of four years who had been treated with home remedies for several days for a "bad cold." The laryngeal stenosis was so pronounced that intubation was the very first remedy that came into my mind. However, while waiting for a bacteriologic report I proceeded to inject the little sufferer with 10 cc of Marmorek's serum and 2500 units of Calmette's diphtheria antitoxin. The report showed the

wisdom of the course pursued, for by the time the report was returned, (showing vast numbers of both streptococci and Klebs-Loeffler bacilli), there was quite a change for the better in the condition of the patient. So rapid was the improvement that, aside from the best hygienic measures that could be practiced among very unsanitary surroundings, very little else was done in the way of treatment. It is possible that this child might have recovered under anti-diphtheritic treatment alone; but in the light of such extended experience with similar cases that did not recover, and considering the fact that both infections gave way simultaneously, as if in response to the specific measures employed, it is but fair to presume that without the anti-streptococcic serum the recovery would have been much slower and not entirely free from disagreeable sequelæ.

CASE 4. *Scarlet fever.* The case here mentioned is one of three occurring in the same family during the month of December, 1897. The patient, a girl of seven years, was attacked with decidedly violent symptoms—the pulse, temperature, nausea, head pains and angina all indicating a case of unusual severity. On the morning of the second day, when the eruption seemed to hesitate about making its appearance on schedule time, I administered 10cc of the Marmorek serum. Six hours later the entire aspect of the case had changed. The eruption had extended over the entire trunk, defervescence was well under way, vomiting had ceased and the patient was much more comfortable in every way. Convalescence and recovery were uneventful. If Brother "Thomas" insists that the serum had nothing to do with the amelioration of the symptoms in this case, my answer is that the two sisters of this child, who were subsequently attacked with a much milder form of the disease, did not have the serum treatment, and in both cases the recovery was much

slower and less satisfactory. In addition to this I would call his attention to the reports of hundreds of cases treated by Dr. Henry W. Berg at the Willard Parker hospital in New York, Dr. Sevestre at the Sick Children's hospital in Paris and Dr. Marmorek at the Hospital Trousseau, also in Paris. Full accounts of these cases may be found in the Medical News of April 4th and June 27th, 1896, and the Annales de l' Institut Pasteur, January, February and March, 1896.

CASE 5. *Tuberculosis with mixed infection.* J. R., aged 58, supposed to be far advanced in pulmonary consumption, and a casual glance would confirm this diagnosis. However, upon careful microscopic examination it was found that the tubercle bacillus probably had but little to do with the gravity of the case, and that the streptococcal infection was the chief danger-producing factor. Upon this theory the treatment was at once begun, and consisted of 10cc of Marmorek's serum every alternate day until seven doses were given. As all streptococci had now disappeared from the sputum, and considerable general improvement noticed, the serum was discontinued and the patient placed upon a course of tonic and hygienic treatment. I have watched this case with unusual interest, and I am happy to report that to-day—eighteen months after the serum treatment was stopped—he is in better health than he has been for many years. This case illustrates two very important points, namely, that the complications of tuberculosis are often worse than the disease itself, and that at least one of these complications—the one most frequently met with—can be easily and quickly eliminated. It is hardly necessary to add that in all such cases as this the life of the patient will be greatly prolonged and rendered enjoyable by the timely employment of Marmorek's serum.

If more evidence were necessary to prove the value of this remedy, attention might be directed to its successful employ-

ment in a large number of similar cases of undoubted authenticity, as well as to many others of different kinds, such as Dr. Millican's case of diffuse cellulitis (New York Medical Journal, February 9, 1898), and a number of cases of ulcerative endocarditis reported by Drs. Fox, Pearse, Washburn and Sainsbury, Lancet (London), October 17, 1896, February 20, July 10, and September 18, 1897.

In conclusion, streptococcal infection is a widespread, treacherous and often a death-dealing condition which can easily be detected and as easily cured if the proper means are employed at the proper time. A microscopic examination will confirm the diagnosis and Marmorek's serum will accomplish the cure.

DISCUSSION.

DR. GEORGE F. BUTLER, Chicago: I would like to inquire of Dr. Cox if he has ever used nuclein solution hypodermically in certain infectious diseases, or in streptococcic infection, and if so, what his experience has been?

DR. J. W. HAIRGROVE, Jacksonville: I have been very much interested in the paper of Dr. Cox, and particularly in reference to mixed infection. I have long been of the opinion that in cases of mixed infection we may have the tubercle bacillus associated with some other germ. Most of us are familiar with the fact that we may have a latent tuberculosis existing for a considerable time in the pulmonary tissue, and yet not have the manifestation of constitutional symptoms. There may be a mixed infection with streptococci. I think investigations show that studies in this direction have not been carried forward enough, and that we have much to learn in the study of mixed infections and in cases of tuberculosis.

A year ago I had a personal experience with the use of streptococcic serum, having had infection from an operative wound. Further investigations need to be carried out along the line of serums in different directions, otherwise much harm will be done.

DR. COX (closing the discussion): In my paper I tried to point out that if you have pure serum there is practically no limit to the amount which you can give to patients. Practitioners should strive to procure a pure serum, as this will obviate any danger or harm which might otherwise occur.

In answer to the question of Dr. Butler relative to the use of nuclein solution, I will say that I have had some experience with it in connection with other remedies, such as tubercular remedies and streptococcal serum in cases of tuberculosis alone, as well as wasting diseases of that character. It has been my fortune to treat a number of such cases during the last two years. I first began on the theory of trying to get rid of the complication first in cases where I could do it, but it is not always possible to do so. I believe we can kill streptococci by the administration of Marmorek's serum, but there are other complications which will prevent the tubercular treatment from having the beneficial effect which we would expect from it.

OBSERVATIONS ON THE BLOOD OF TUBERCULAR PATIENTS.

BY GEORGE W. JOHNSON, B. S., M. D., CHICAGO.

These observations were made on patients in the advanced stage of the disease with cavities, and at times hemoptysis.

The question has been asked by Cabot and Klebs, "What is the cause of the apparent anemia in tubercular patients?" Cabot and others have found that it is not due to a reduction in the hemoglobin, and the same authority states that in uncomplicated tuberculosis the number of red corpuscles remains practically normal.

In my observations, especial attention was paid to the patient's physical condition as to cavities and hemoptysis. The observations were made just before meals, and no attacks of hemoptysis occurred between the first and second examination. The patients were up and out of doors most of the time during the day. The microscope was used to compute the blood count.

Of 33 patients examined, all had cavities of various sizes, and all had had hemorrhages or hamoptysis. Of these 33 cases, 25 were found to have a leucocytosis; that is, their white cells ranged above 7,500 per c. m. Cabot makes this number as a normal basis. The 25 having leucocytosis also showed cavities. Cabot and others state that there is always a leucocytosis when there are cavities and after hemorrhages. Nine of the 33 showed a red blood count of 5,000,000 or above, which Cabot also states as a normal basis. The remaining 24 showed a red cell count, in many instances far

below 5,000,000, and in no case was the hemoglobin up to normal. In only one case did it reach 75 per cent. Thus we have a diminution in both red cells and hemoglobin, therefore anemia, while the white cell count showed leucocytosis. These observations agree with Cabot as to leucocytosis, but not in the red cell count or hemoglobin percentage. Perhaps these cases were more advanced than the ones he observed, and also had more mixed infection.

Having made observations to determine the character of the blood, I also made some therapeutical observations, using 5 per cent. nucleinic acid, No. 2, in the first ten cases; 5 per cent. nucleinic acid, No. 1, in the second ten cases; ferratin in six cases and heminol in five cases. The first 10 were given 2 drams every four hours for twenty-four hours. The second blood observations in the first 10 cases showed 6 out of the 10 to have a still greater leucocytosis. The red blood count was practically unchanged. The hemoglobin showed an increase of from 3 per cent. to 10 per cent. in those cases in which there was a leucocytosis. [See page 218.]

The second ten were put on the nucleinic solution, No. 1, which is chemically pure and for hypodermic use. Thirty minims were giving hypodermatically every four hours for twenty-four hours. A second count in these cases showed the same condition as in the first ten, which were given the No. 2 solution orally. [See page 219.]

None of these patients complained of any evil effects, while, on the other hand, they all experienced a sense of well-being and renewed energy. Their circulation was better, and the appetite improved. I have noticed repeatedly the splendid stimulating effect of nucleinic acid in every case in which I have used it. In cases not tubercular I have had splendid results.

It is reported by Dr. Hahn, of the University of Munich,

that the number of leucocytes can be doubled in a short time by the use of nucleinic acid, and Von Mayer, of Prague, reports an average increase of leucocytes of over seventy-five per cent. following the administration of nuclein. I have had a similar experience in cases not too debilitated. Six cases were put upon ferratin. Five grain doses were given every four hours for twenty-four hours. A second examination of the blood of these six cases showed an increase in the leucocytosis. Four also had an increase in the red cells with an increase of fifteen per cent. in hemoglobin. In one other case, not tubercular, but violently anemic, after being on ferratin of three and a half grains, t. i. d., for ten days, showed an increase in hemoglobin of twenty-seven per cent., and an increase of red cells of over 1,000,000 per c. m. [See page 220.]

Five cases were put upon heminol; fifteen grain doses were given every four hours for thirty-six hours. A second examination of the blood of these patients showed an increase of the red cells in four cases. Three showed an increase in the number of white cells, and only two showed an increase in the hemoglobin percentage.

I do not consider these altogether fair tests of the value of hematinics, inasmuch as the patients were almost moribund. [See page 221.]

It is my intention to make a more extensive study of the blood in this class of patients with the view of determining, if possible, why they appear to be so profoundly anemic, when the examination of the blood shows them to be only moderately so. The blood of these thirty-three cases was stained and studied; in but two cases was there found a poikilocytosis.

TABLE I.

No.	Date.	Sex.	Age.	Family History.	Duration.	Hæmoptysis.	Sputum Analysis.	Physical Condition.	Red Cells per C M.M.	Per cent. Red Cells.	Per ct. Hæmoglobin.	Corpuscles Index.	White Cells per C. M. M.	Treatment and Remarks.
1	5-2-98	M	46	Negative.	2 yrs.	....	T. B. Absent.	Fairly Nourished.	4.936.560 * 4.984.800	98.7 99.6	75 52	75.9 52	14.910 ?	....
2	5-2-98	M	58	Negative.	?	....	T. B. Present.	Fairly Nourished.	4.984.800 * 5.065.200	99.6 101.2	73 75	72 74	11.020 8.190	....
3	5-2-98	M	32	Negative.	9 yrs.	....	T. B. Present.	Fairly Nourished.	5.540 000 * 5.226.000	110.8 114.8	70 70	63.1 67	10.290 13.860	....
4	5-4-98	M	49	Negative.	5 yrs.	....	T. B. Present.	Fairly Nourished.	5.609.920 * 4.422.000	112 88.4	60 53	53.5 59	9.870 8.610	....
5	5-4-98	M	25	Negative.	1 yr.	P.	T. B. Present.	Emaciated.	3.778.800 *.....	76.4	55 60	72.9	8.190 12.180	....
6	5-4-98	M	67	Tubercular.	4 yrs.	P.	T. B. Present.	Fairly Nourished.	4.261.200 * 4.341.600	85.2 86.8	45 55	52 63.3	5.880 7.210	....
7	5-4-98	M	39	Negative.	13 yrs.	P.	T. B. Present.	Fairly Nourished.	4.100.400 * 3.537.600	82 90.6	63 65	76.8 92	6.300 5.880	....
8	5-4-98	M	46	Tuberculosis.	6 mos.	Ab.	T. B. Absent.	Fairly Nourished.	5 502.000 * 5.475.640	110 109.4	35 40	31.8 36.7	8.450 15.990	....
9	5-4-98	M	52	Tuberculosis.	4 yrs.	P.	T. B. Present.	Fairly Nourished.	4.180 080 * 4.631.040	83.6 92.6	60 60	71.8 64.8	6.300 7.350	....
10	5-4-98	M	75	Negative.	?	Ab.	T. B. Present.	Fairly Nourished.	4.341.600 * 4.100.400	86.8 82	55 60	63 73.1	5.250 9.660	....

*Second examination, after the administration of 5 per cent. Nuclein No. 2 for 24 hours.

TABLE II.

No.	Date.	Sex.	Age.	Family History.	Duration.	Hœmoptysis.	Sputum Ananlysis.	Physical Condition.	Red Cells per C.M.M.	Per cent. Red Cells.	Per ct. Hœmoglobin	Corpuscles Index.	White Cells per C. M. M.	Treatment and Remarks.
11	5-6-98	M	50	Tuberculosis.	1½ yrs.	P.	T. B. Present.	Fairly Nourished.	5.049.120	100.8	55	54	19.300	.....
									* 5.386.800	107.6	70	65	15.990	.....
12	5-7-98	M	44	Negative.	1½ yrs.	P.	T. B. Present.	Poorly Nourished.	3.296.400	65.8	45	69.9	12.810	.....
									*.....	.....	40	.....	6.930	.....
13	5-7-98	M	40	Negative.	6 yrs.	P.	T. B. Present.	Emaciated.	3.785.120	75.6	75	99	10.920	.....
									*.....	.....	78	.....	9.450	.....
14	5-7-98	M	62	Negative.	8 mos.	P.	T. B. Present.	Emaciated.	3.620.160	72.4	45	62.1	11.760	.....
									*.....	.....	50	.....	11.700	.....
15	5-7-98	M	26	Negative.	1 mo.	P.	T. B. Present.	Emaciated.	3.537 600	70.6	40	56.6	15.120	.....
									*.....	.....	60	.....	18.270	.....
16	5-7-98	M	31	Negative.	4 mos.	P.	T. B. Present.	Fairly Nourished.	4.341.600	86.8	63	72.4	11.550	.....
									*.....	.....	60	.....	9.870	.....
17	5-7-98	M	39	Negative.	2 yrs.	P.	T. B. Present.	Fairly Nourished.	4.341.600	86.8	45	51	9.240	.....
									*.....	.....	55	.....	12.390	.....
18	5-7-98	M	43	Negative.	6 mos.	P.	T. B. Present.	Emaciated.	4.048.000	80.8	85	105	7.584	.....
									*.....	.....	75	.....	6.510	.....
19	5-7-98	M	70	Negative.	3 yrs.	P.	T. B. Present.	Emaciated.	5.137.560	102.6	55	53.6	7.980	.....
									*.....	.....	55	.....	7.980	.....
20	5-7-98	M	31	Negative.	6 mos.	P.	T. B. Present.	Emaciated.	2.744.856	54.8	45	82.1	10.920	.....
									*.....	.....	30	.....	10.080	.....

*Second examination, after administration of 5 per cent. Nuclein No. 1 for 24 hours, administered hypodermically.

TABLE III.

No.	Date.	Sex.	Age.	Family History.	Duration.	Hæmoptysis.	Sputum Analysis.	Physical Condition.	Red Cells per C. M. M.	Per cent. Red Cells.	Per ct. Hæmoglobin.	Corpuscles Index.	White Cells per C. M. M.	Treatment and Remarks.
				Wife died					4.582.800	91.6	50	54	17.850	.....
21	5–12–98	M	47	Phthisis.	8 mos.	P.	T. B. Present.	Emaciated.	* 4.422.000	88.4	65	73	7.140	.....
									5.708.400	114	75	65	9.030	.....
22	5–12–98	M	27	Negative.	6 mos.	P.	T. B. Present.	Emaciated.	* 5.065.200	101.2	70	69	9.660	.....
									3.710.560	74.2	70	94.3	10.200	Just bathed.
23	5–12–98	M	53	Negative.	6 mos.	P.	T. B. Present.	Emaciated.	* 4.293.360	85.8	55	64	6.300	.....
								Fairly	4.100.400	82	50	60	11.340	Coughs.
24	5–12–98	M	53	Negative.	1 yr.	P.	T. B. Present.	Nourished.	* 4.422.000	88.4	50	58	13.020	.....
								Poorly	3.537.600	70.6	65	92	4.630	.....
25	5–12–98	M	33	Negative.	2 yrs.	P.	T. B. Present.	Nourished.	* 3.778.800	75.4	73	96	7.560	.....
									4.020.000	80.4	40	49	7.770	.....
26	5–12–98	M	48	Negative.	9 mos.	P.	T. B. Present.	Emaciated.	* 4.180.800	83.6	48	57	17.640	.....

*Second examination after the administration of Ferratin for 24 hours.

TABLE IV.

No.	Date.	Sex.	Age.	Family History.	Duration.	Hœmoptysis.	Sputum Analysis.	Physical Condition.	Red Cells per C. M. M.	Per cent. Red Cells.	Per ct. Hœmoglobin.	Corpuscles Index.	White Cells per C. M. M.	Treatment and Remarks.
								Poorly	3.216.000	64.2	55	85	8.190	.....
29	5–13–98	M	36	Negative.	8 mos.	P.	T. B. Present.	Nourished.	* 3.309.200	77	40	51.9	12.810	.....
				Tuber-				Fairly	3.698.400	73.8	60	81	10.920	.....
30	5–13–98	M	53	culosis.	?	P.	T. B. Present.	Nourished.	* 4.100.400	81	45	55	17.855	.....
				Tuber-					3.248.160	64.8	55	84	8.820	.....
31	5–13–98	M	52	culosis.	?	P.	T. B. Present.	Emaciated.	* 3.537.600	70.6	50	73.3	8.610	Nephritis.
								Fairly	3.698.400	73.8	55	79	15.121	.....
32	5–13–98	M	23	Negative.	4 mos.	P.	T. B. Present.	Nourished.	* 3.459.200	69	60	86.9	12.810	.....
				Tuber-				Fairly	4.502.000	90	60	66	10.718	... .
33	5–13–98	M	52	culosis.	?	P.	T. B. Present.	Nourished.	* 5.316.040	106.2	75	70.7	16.590	.....

*Second examination, after the administration of Heminole for 36 hours.

DISCUSSION.

DR. GEORGE W. COX, Chicago: *Mr. President*—My experience with nuclein has been very limited, and I have not used it in what I would call a scientific manner, for the simple reason that I have not taken pains to make blood examinations, consequently my experience is not of any great value. I will say, however, that in clinical cases, regardless of blood examinations, nucleinic acid has been of decided value in my practice in tubercular cases, as well as in some instances where there were complications, as referred to in my paper, but in those cases I resorted to other remedies, paying attention to hygiene, etc. Among other remedies, nucleinic acid has been one of my stand-bys, and I have used it at the suggestion of Dr. Ames, of Baltimore, who has made a special study of it. I have not had such good results from ferratin as I have had from the nucleinic acid.

AN UNDESCRIBED FORM OF LA GRIPPE.

BY H. W. CHAPMAN, M. D., WHITEHALL.

In the summer of 1895, in the New Albany Medical Herald, I called attention to a form of La Grippe that had visited us the preceding winter and which I had not seen described. It appeared again in epidemic form during the winter of 1896 and '97. The more severe cases commenced with sneezing, a discharge of clear water from the nose, and lachrymation. Soon fever sets in, accompanied with rigors and headache. The naso-pharyngeal mucous membrane and veil of the palate are highly inflamed, causing great pain in efforts of deglutition. The inflammation extends rapidly to the frontal and sphenoidal sinuses and ethmoid cells. This is the peculiar feature of the disease—the inflammation of these mucous cavities in an epidemic form. There is a constant dull pain in the situation of these sinuses, different from ordinary headache and very distressing. Vertigo is marked, prominent, and lasts throughout the disease and convalescence. The pulse is but little accelerated and weak. Temperature 100–101 F., which in a few days becomes normal. The appetite is impaired, or more properly speaking, lost, as is also the capacity for sleep. The strength is reduced out of all proportion to the gravity of the symptoms. There are muscular tremblings and profuse perspiration on very slight exertion. During all this time the nose is very much in evidence with its wonderfully profuse discharge of clear or yellowish water, thick, tenacious muco-pus and blood, singly,

alternately and collectively; this lasts through the entire disease, the water being apparently as free towards the end of the malady as at the beginning. At times the discharge is all via the posterior nares, rendering the handkerchief a matter of secondary importance. The mental powers are not active and the head causes great distress. Convalescence is slow and the patient experiences great difficulty in regaining strength. A partial paralysis of the lower extremeties, both sensation and motion, is a not infrequent sequela, and is not a matter of surprise when we come to consider the proximity to the brain of these sinuses, and the exceedingly thin bony walls separating them from the cranial cavity. The specimen which I now show you, prepared to display these cavities, illustrates the situation very beautifully. When one comes to consider the large mucous surfaces lining these cavities, and the small apertures for drainage, it becomes evident that we have here an abundant source of systemic poisoning, and all the necessary concomitants of a serious malady, and one which I believe has been largely overlooked.

Should pneumonia or bronchitis supervene, as one or the other sometimes does, the patient is in a very unfavorable condition to cope with the complication.

INFANT FEEDING AT HOME AND ABROAD.

BY A. C. COTTON, A. M., M. D., CHICAGO.

The importance of the subject of Infant Feeding requires no emphasis nor amplification at the present time, as any practitioner will vouch for the statement that the high percentage of infant mortality is largely due to imperfect nutrition and the so-called dietetic disorders.

That hoary scape-goat "heredity" has been loaded with our sins of omission until with broken back he has dragged himself away to the wilderness of oblivion to keep company with "general debility."

Until recently the monographs and lectures on the care and management of the infant and a good portion of our text-books on pediatrics resembled more the popular cook books or Mrs. Blank's "Dietary for the Sick" than scientific treatises based upon known physiologic and clinic data.

The past decade has witnessed a remarkable activity in physiological and clinical study of infant dietetics. From the great mass of material presented a few facts and principles have been established beyond question, viz.:

1. In a very large majority of cases the infant is best nourished at the mother's breast.

2. The best substitute is a suitable wet nurse.

3. The best standard of quality for artificial food is average breast milk.

4. In cases where the infant does not thrive at the breast, the milk should be examined to determine wherein it varies from the average normal.

5. In disturbed lactation the nurse should be treated physiologically and hygienically to bring the total quantity of her milk and the qualitative relation of its constituents to the requirements of that infant's nutrition.

6. That the regular use of the scales and occasional analysis of the breast milk give the physician a remarkable control of the infant by the early detection and correction of dietetic errors. When temporary artificial feeding is necessary, an analysis of the breast milk will, if agreeing, give a standard for the preparation of the substitute food; if disagreeing, may suggest the cause of disturbance and the corrective procedures.

7. In considering an artificial diet certain essential requirements must be borne in mind: a—The symmetrical development of the infant requires certain food constituents, viz.: hydrocarbons, carbohydrates, albuminoses, mineral constituents and water. b—That normal nutrition requires a more or less quantitative relationship between these five essential constituents. Physiological facts, chemical analysis and clinical observations many times repeated by careful observers, constantly agree as to the quantity, quality and form of food; also methods and frequency of ingestion for the average infant.

Cheadle's essentials seem, in the light of our present knowledge, so axiomatic that the writer begs leave to quote.

1. The food must contain all the constituents and in the same proportion as found in the mother's milk.

2. It must be administered in a form suitable to the physiological requirements of infant digestion.

3. The total quantity in twenty-four hours must be such as to represent the nutritive value of one to three pints of human milk, according to age.

4. It must possess the anti-scorbutic element.

5. It must not be purely vegetable but must contain a large proportion of animal matter.

6. It must be free from taint of decomposition and pathogenic organisms.

These essentials being settled, it is a source of surprise to the writer that the dietetic errors and pernicious methods of feeding so generally persist.

That some feed better than they know, is in evidence when we observe the ignorant young mother nourishing perfectly her vigorous babies while violating perhaps some of the technical canons of scientific feeding. That some know better than they feed, was made evident to the writer during the past year when in quest of information he visited the fields of activity of some of the great pediatric teachers and thinkers of Europe. Who would question the ex-cathedra character of the utterances of those sages of Great Ormond Street and St. Mary's, or of the brilliant coterie of observers in Paris where children's hospitals and foundling homes do greatly abound; or the toiler, Biedert, the father of European milk modification, who even declines to patent his brain sweat; the ancient, ponderous Vincent, of Munich; the versatile, irrepressible Escherich, whose carefully compiled statistics gridiron the pages of foreign journals; the great Gärtner, who once did some thinking and teaching about milk in the University of Vienna; Professor Wiederhofer, of the same, with his vast clinical opportunities in the Kinderspital and Allgemeine Krankenhaus; the vigorous Monti, of the Poliklinik with his echoes, Herr Wolff and Popper, claiming to have mixed up Biedert with his own cream and thrown Gärtner off at a tangent from his milk and water centrifuge; the accurate, painstaking Lehmann and his go-you-one-better Hesse; the dignified, conservative Heubner, of Berlin University, and the resourceful Baginski, with his active lieutenants at the Fried-

rich Wilhelm; the polished, urbane Filatow, with his acres of maternity and foundling's wards in Moscow. These are a few of the many foreign workers whose relations to laboratories, hospitals and the vast clinical fields peculiar to Europe have given their observations and deductions a weight that has stamped them upon all our pages as text.

To see these thinkers and their immediate disciples in their every day application of those principles of infant feeding, which have been an important part of our knowledge of infantile physiology, was the writer's main object in a tour of Europe. Surely it is in the great municipal, state and eleemosynary institutions, whose sanitation is under the full control of the great professors, that the dietary principles so elaborately taught would be most thoroughly applied.

In the Great Ormond Street Children's Hospital, whose walls have listened to the arguments of Cheadle for a balanced diet, they are ordering soups, barley water and dilute cow's milk.

The same old haphazard feeding is seen all over Paris with one or two exceptions. Sir William Priestly, writing of M. Budin's clinics in the British Medical Journal, quotes that teacher's opinion that the dilution of cow's milk is unwise and unsafe, and advocates the use of whole milk. He appears to be much pleased with an ingenious stopper used in the sterilization.

Vincent orders in the hospital and dispensary at Munich diluted cow's milk, sometimes goat's milk and farinaceous slops.

Fronz at Wiederhoffer's clinic was using soups and broths, dilute cow's milk, Russian tea and cognac. Some Vienna physicians were prescribing Gärtner's milk. Monti, besides meat and vegetable soups, claimed to be using an improved modified cow's milk. His assistant at the Poliklinik, Herr

Wolff, claims in a tabulated report great results from Professor Monti's modification; so the laboratory where this was prepared was, for this time, the writer's Mecca. Did you ever, in earlier days, seek the pot of gold under the rainbow? With like hopes and disappointment we sought for evidence of Monti Milk Modification. With the aid of the genial Herr Wolff we located the process in the great Vienna Molkerei and hours were spent in inspecting a model butter and cheese factory with most of the improved methods of handling, cooling, æriating, filtering, sterilizing, separating and pasteurizing milk, but no evidence of modification a la Monti. We were told that was done only at 10 A. M. At a morning call we were informed that the process was over for the day, but we were shown a box containing racks and hot water which suggested pasteurization—and we gave it up as a myth.

Similar was the experience at Prague, where the babies in the large children's hospital were, it was claimed with great enthusiasm, fed secundum artem. Explicit directions led to the Molkerei famous for its Kinder Milch Modifikation. At last with his own eyes the writer saw, in a neat, well equipped and prosperous dairy, the entire process, the far-famed modification of Säuglings milk. Shades of the reputation of Biedert and Lehmann and even Professor Mother Gärtner! Six ounce vials were filled, a perforated cork inserted and stoppered by a slender, tapering glass plug, (possibly the device which so delighted the worthy Priestly at Paris), placed on racks and immersed in a hot water bath. After heat and time sufficient for pastuerization, the bottles were removed, cooled and labeled No. 1, 2, 3 and 4; No. 1 containing 25 per cent.; No. 2, 50 per cent.; No. 3, 75 per cent.; and No. 4, 100 per cent. of cow's milk; the diluent consisting of sterile water, pure and simple. This diluted milk is prescribed by the leading physicians of Prague, and the enterprising Bohe-

mian Molkerei man is laying up treasures on earth. I thought of the box in the Vienna cheese factory which was helping Monti on to fame, and when later, after watching Heubner's infants imbibing their various modifications of milk in the Berlin Charité, I discovered cases in the corridor filled with vials bearing the legends 1, 2, 3, 4, I again thought of Prague.

Baginski, in his hospital, did the best feeding, as it was not unusual to see his infants on definite proportions of Biedert's cream mixtures and cow's milk. He keeps his own cows, reads half a dozen American journals, among others Pediatrics, the Archives of Pediatrics, and the Journal of the American Medical Association, and ere this the writer hopes he is modifying his milk on the American plan. We showed the prescription blanks for milk modification in the leading American cities to many forgein baby feeders and likewise exploited the details in a paper before the Pediatric Section of the Twelfth International Congress at Moscow. In every case we were listened to with interest, but with only partly concealed incredulity as to the actual, practical operation of the American system. Their reluctance to accept our statements the writer is unable to explain unless due to the European doubt as to the possibility of any good scientific thing coming out of the American Nazareth. It may be a feature of European conservatism to dream, philosophize and experiment for a long time before applying the deductions to practical uses. It may be that infants are fed artificially in Europe according to the teachings of modern science, but the writer failed to discover, in his visits to the hospitals and clinics of London, Paris, Brussels, Heidelberg, Berne, Zurich, Munich, Vienna, Dresden, Prague, Berlin, Moscow, St. Petersburg, Helsingfors, Stockholm or Copenhagen any instance in which specific definite percentage feeding was attempted.

Biedert's mixtures may be regarded as an effort at definite

percentage. So also the formulæ of Lehmann and Hesse and even Professor Gärtner may be definite enough. As much credit belongs to the better class of artifical commercial foods of our own country. The same objection, however, applies to both: no attempt is made to adapt the preparation to the varying requirements of the physiology, pathology or individual characteristics of the specific case.

The European idea, when one is in evidence, seems to be to adopt a mixture which most nearly resembles average mother's milk (except as to the anti-scorbutic qualities, for they all employ heat) and make this do with their 1, 2, 3 and 4 variations for all the babies. If it fails to agree, so much the worse for the babe. The food was all right, for it was sanctioned by the highest authorities.

The war is now on between Biedert, who has done more than any other man in Europe to establish percentage feeding, and Gärtner, who has fallen into the commercial slough—the last catastrophe of noble scientific minds. He has attached unto his interests the brilliant and versatile genius of Escherich, who is now making a spectacle of himself moving up and down Europe abusing Biedert and descanting with silver tongue upon the virtue of the product of the milk and water wheel labeled Professor Gärtner's Mother's Milk and sold by all druggists.

That America leads the world in artifical feeding of infants must be acknowledged by those who will carefully compare the actual progress in this branch. This condition is due to the fact that under the stimulation of Rotch and others American physicians are rapidly recognizing the necessity for exact, specific percentage feeding. Much, however, remains to be learned. We must study very closely normal lactation, its variations and disturbances, with their causes; also the effects of these different variations on infant nutrition.

But, says one, the market is filled with baby foods. Must we reject all? The answer may be obtained by applying the following tests:

1. Does the food contain all the constituents in about the same proportions as found in mother's milk?

2. Can this food be administered in a form suitable to the physiological requirements of the infant's digestion?

3. Can it be given in quantities adapted to the capacity of the infant's stomach?

4. Does it possess the anti-scorbutic property or has that been destroyed by cooking?

5. Is this food wholly or partly of animal origin?

6. Is it free from pathogenic micro-organisms?

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CHELIDONIUM MAJUS IN INOPERABLE CARCINOMA.

BY C. C. HUNT, M. D., DIXON.

By reference to almost any edition of the United States Dispensatory, or to almost any work on Therapeutics, we find that Chelidonium is an old officinal plant, the juice of which was long ago used as a local application for the removal of corns, warts and various other excrescences. In course of time it fell into disuse, like many similar plants, but recently it has been revived by a Russian physician, Doctor Denicenco, who published a number of cases of cancer treated by the drug with very favorable results. An extract from this publication, translated by Dr. Alfred Gordon, of Philadelphia, appeared in the Philadelphia Medical Recorder for December 26th, 1896. This extract is short, and for convenience I will quote it in full.

"Dr. Denicenco (Wratsch, St. Petersburg) experimented with chelidonium first in cancer of the lips, and, having obtained good results, he used it in inoperable cancers. He employed the extract internally, in painting and interstitial injections. The patient takes 1.50–5 grams (ʒi–jss) of the extract in twenty-four hours in the form of a solution in aqua distillata or aqua menthæ piperita. The painting is done twice a day on ulcerated surfaces with a mixture of two parts of extract of chelidonium and one part of glycerin. Interstitial injections are made with a mixture of equal parts of extract of chelidonium, glycerin and water. On account of a prompt deterioration of the solution one-half per cent. of chloroform

is added if it is wished to preserve the liquor for two or three days. Every day one Pravatz's syringeful is injected. The injections cause pain in the place of the injections, after which comes a general weakness, a severe chill and elevation of the temperature to 38°–39° C., but the next day all these symptoms disappear. On the first days of the treatment the tumor softens and seems to melt; in three to five days the fistulas appear at the level of the punctures; around these fistulas the neoplasm seems to be dissolved; in fifteen to twenty days the healthy tissues seem to be separated from the tumor, which is expelled; the ganglions become normal. The author examined histologically all the cases which he had for observation and is assured of their malignant nature."

From other literature relating to chelidonium in the treatment of cancer—see references at the end of this paper—we gather some additional information, to-wit: Dr. D. first used the fresh juice of the herb, but since 1895 the extract obtained from apothecaries. To this he adds equal parts of distilled water and glycerin for interstitial uses, gives internally from one to three and a half scruples of the extract daily and paints twice daily the ulcerated places with one to two parts of extract to one part of glycerin.

This comprises all the literature on the subject at my command up to this time. Comprehensive details of treatment are not given, nor are we in possession of tabulated results. But so meagre has been the encouragement offered by surgery or any known means of combating the ravages of cancer that any agent which *seems* to have any efficacy whatever in this direction, however empirical its administration may appear, is seized upon with avidity by patient, friends and physician alike. Rational methods of treatment imply fixed knowledge of the pathology of the disease to be treated. In the absence of well defined and accepted pathological knowledge

empirical methods are justifiable, because these are our only resource. We are taking no steps backward, therefore, when we are constrained to administer a drug which experience has shown to have had at least a salutary influence over a morbid condition of the real pathology of which we know but little or nothing, and the inevitable tendency of which is death to the individual. Impressed with these convictions, I felt warranted in using the remedy in the following case: Mrs. K., aged 57, of good family history, came to my office for examination June 12, 1897. She called my attention to a tumor on her right shoulder which she said a surgeon had removed two years before with the knife, but which promptly returned within six months. Upon examination I found a globular growth about the size of a turkey's egg situated in the angle formed by the acromium process of the scapula and the clavicle. Skin intact; blood vessels over and in the immediate neighborhood of the growth greatly enlarged; cervical and axillary glands swollen; slight fluctuation apparent at summit of the mass; cough, with mucopurulent expectoration, which she said she had had for thirty years; physical exploration of chest, aside from coarse rales equally hard on both sides, gave negative results; repeated microscopic examination of various slides failed to show the bacilli of tuberculosis, yet she had a temperature at this examination of 101°–101½°. For many days subsequently she had a temperature under tongue of 100° to 103° F. in the afternoon. She complained greatly of shooting pains, radiating from the growth, running down the arm and through right side of neck, the motions of which were thus greatly compromised. All the symptoms, objective and subjective, led me to believe that the growth was malignant, probably a carcinoma. She declined most positively to allow me to snip off a portion for microscopic examination, much less would she consent to its

removal with the knife, as I urgently advised. I then suggested resort to interstitial injections, without promising any favorable result, but simply said, "possibly some good may come of it." She went home to reflect over the matter, and in the meantime I directed her to apply daily a fluid extract of chelidonium majus, on absorbent cotton protected by a bandage. About a week subsequently she reported again at my office ready to submit to the treatment suggested. Upon removing the dressings I found the skin covering the growth removed by ulceration to the extent of a circle an inch and a half in diameter, exposing a red, brainlike mass, very sensitive to the touch and which bled freely on puncture; no odor, general condition same as one week ago. Having in the six months preceding used the fluid extract of chelidonium majus, (P. D. & Co.'s), at first with equal parts of pure glycerin and absolute alcohol, later undiluted, interstitially in two cases of cancer of the rectum, with rather encouraging results, I resolved to begin this one with the fluid extract in full strength. Accordingly, on June 24th, 1897, by means of an aspirating syringe, I injected into the substance of the growth at four or five points, reaching down deep into the base from which it sprang, 10 c. c. of the fluid, all the syringe would hold. Considerable blood followed each, but was readily arrested by pressure with a piece of aseptic gauze. Two or three layers of gauze saturated with the fluid extract were placed over the growth, on this a layer of absorbent cotton, held in place by a figure of eight bandage. These injections and dressings were repeated almost daily until August 7th following, 68 days. Then again on August 10th, 14th, 18th, 23rd and 30th. On this last date but a mere trace of the growth remained. She continued the dressings (omitting injections) until September 26th, at home. On this day when she came to my office I found only a small, healthy looking scar. The

constitutional disturbance had entirely disappeared. No glandular infiltration perceptible anywhere; motion of arm and neck normal; had gained in weight and strength and was about her household duties—those of a farmer's wife—as usual. I examined this case quite recently, and it was difficult to find the small trace of scar tissue remaining. It was three weeks from the first injection before any marked change was noticed in the size, or sensitiveness or vascularity of the growth. I then evaporated the fluid extract so as to double its strength. From this on it diminished more rapidly. There was but very little sloughing properly so-called. The effect of the remedy seemed to be to produce contraction of the arterioles, strangulation, and consequent cutting off of the blood and lymph supply, necrobiosis resulting. As before stated, I injected at four or five points; sometimes at eight or ten points. I usually used one syringeful, 10 c. c., but now and then two. These injections were made on 52 days. An average of five punctures at each seance would make 260 punctures in all, (a low estimate.) At no time was any of these followed by any constitutional disturbance or other unpleasant effect. The chill and rise of temperature following the first injection, as noted by Dr. Denicenco, were at no time in evidence. I omitted to mention that patient took internally ten drops, gradually increased to fifteen drops, of the medicine three times a day most of the time. Sometimes fifteen drops would be followed by nausea. It somewhat relaxed the bowels. What part this internal administration played in producing the final happy result I am not prepared to say.

Now as to the nature of the growth. It was some weeks after beginning the injections before I could secure a portion for microscopic examination. Patient would bear a multitude of punctures from day to day, with a large syringe point,

with the stoicism of a martyr, but at the least suggestion of any cutting instrument she would suffer such paroxysms of fear as could be overcome by no amount of coaxing. One day, however, I succeeded in clandestinely snipping off a portion least affected by the remedy. This I sent to Dr. Graham of the Presbyterian Hospital, Chicago, who referred it to the hospital pathologist. He reported that he could exclude sarcoma and tuberculosis, and that the sections examined bore a strong resemblance to carcinoma. Moreover, the clinical picture and the microscopic appearances, as I have attempted to describe them to you, warrant the belief that the neoplasm was, indeed, what pathologists have named medullary carcinoma.

One case of unquestionable carcinoma of the rectum, so pronounced by three eminent Chicago surgeons, each of whom declined to operate, came under my observation in December, 1896. I began the interstitial injections in January, 1897, and have continued them ever since, at times with very encouraging results, at other times not. This case is still under observation. The original growth would at times almost entirely disappear, then again exuberant granulation would spring up at the upper margin, disappear after a few or many interstitial injections only to re-appear somewhere else in the immediate neighborhood; but within the last two months there appears a marked hyperplasia of the walls of the gut extending from the seat of the original growth, (just above the internal sphincter,) upwards as far as, or farther than my index finger can reach. So far there has been no other metastasis.

In this case, a man of 72, two severe hemorrhages from the rectum occurred; the first on February 20th, four weeks after beginning the injections, and next day after having taken three one-eighth grain pellets of podophylin at intervals of

six hours. The second occurred just one year later when he had taken no cathartic of any kind, and three days after one of a series of interstitial injections. These hemorrhages were very profuse. Patient never fully regained his former strength. At this time the lumen of the gut remains sufficiently large for practical purposes, though there remains a zone of cicatritial tissue at seat of original growth.

Another case of cancer of the rectum, primarily just within the external sphincter, I saw in consultation with Dr. Grim, of Franklin Grove, Ill., in March, 1897. In this case there was extensive infiltration of the neighboring parts and almost complete stenosis of the gut, so that we thought the time had about come to resort to inguinal colotomy as a palliative measure; but extensive sloughing followed the interstitial injections and the canal was kept pervious for several months until general sepsis put an end to the patient's sufferings.

These, as far as I am aware, are the first, perhaps the only cases, in which the chelidonium has been used in this country in the treatment of cancer. One effect of the remedy is still worth mentioning—it is an excellent deodorizer. The revolting stench usually present in cancer after it has reached the ulcerative stage is almost entirely obviated by a thorough use of the remedy.

Now, the proof of the action of the remedy as observed in these three cases, I admit, is not absolutely conclusive; yet the results appear to corroborate in the main the claims advanced by Dr. Denicenco. I believe we may fairly summarize as follows:

1. Chelidonium majus injected interstitially into the substance of a carcinomatous growth tends to its obliteration by necrobiosis.

2. Copious and frequent interstitial injections of the fluid extract are unattended with danger to the patient if judiciously used.

3. In cancer of the rectum, even at advanced stage, stenosis may be prevented and the necessity of palliative colotomy obviated.

4. It is a deodorizer of no mean power.

5. There is some warrant for the belief that it has a favorable influence over glandular infiltration and tends to prevent metastasis.

6. It is hemostatic and antiseptic.

7. It gives the patient hope, perhaps reasonable hope, of ultimate recovery and thus tends to mitigate or annul the awful apprehensions of impending dissolution, apprehensions, we may well opine, more appalling than death itself.

8. More comprehensive and exact experiments are necessary in order to determine the real value of the drug.

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SUMMARY OF LAWS GOVERNING EXPERT TESTIMONY IN OTHER STATES AND COUNTRIES.

BY JAMES OSBORNE DECOURCY, M. D., E. ST. LOUIS.

To comply with the demands of the management of this section of the Illinois State Medical Society, in attempting to cull out from the vast number of legal documents, statutes and codes of other states and countries such matter as would be necessary to make a complete and well arranged synopsis of the "Summary of Laws Governing Expert Testimony in other States and Countries" would indeed be an arduous task, requiring much time and labor; and when all the matter was collected and properly edited, would make a Medico-Legal volume of considerable proportions.

I, therefore, demur from the duties of so arduous a task, and beg to submit for your consideration the following pages, which have been gleaned from the best libraries, and I sincerely trust the Chairman and members of the section will accept these pages as a small contribution in the direction indicated, if not as a substitute for any expectations that would have looked for something more extensive in scope or complete in summary.

MEDICAL JURISPRUDENCE.

It is proper to clearly understand the difference between an ordinary witness and an expert witness. The former testifies only to facts which he has seen or heard, or learned from personal observation. The expert or skilled witness (expertus) does not necessarily testify to facts, but gives his

opinion on facts observed by himself, or testified to by others. An expert witness is supposed to be specially skilled in the matter on which he is to testify. It is just here, we believe, that the real cause of difficulty lies in medico-legal cases, involving expert evidence. The so called "experts" are usually taken from the ranks of the medical profession. Such persons because they are *doctors*, sometimes unfortunately imagine that they are therefore qualified to act as experts, without any previous medico-legal knowledge or training. This is a very serious mistake. Of course, there must necessarily be a *conflict* of opinion where such an improvised witness is opposed to the genuine expert on the witness stand. We believe that if all the experts were equally skilled, and equally qualified and equally honest, there rarely could occur any conflict of opinions between the opposite sides, since both are equally desirous of discovering and testifying to the truth, and truth is always simple and undivided.

No one should presume to assume the position of an expert witness who has not devoted his special attention to the matter under consideration, and who is, therefore, able to really enlighten the court and jury. Should he foolishly make the attempt, under the idea that he at least knows more than the counsel, he will find that he is sadly mistaken.

The expert witness has his *rights* as well as his duties and responsibilities. One of these rights is his *compensation.* It has often been made a subject of just complaint that an expert witness is placed upon the stand, and his professional opinions, which may be of the utmost value in the pending case, extorted from him piecemeal, by the questionings of counsel, and yet he receives as his compensation merely the pittance of a dollar and a half a day—the pay of an ordinary witness. Some high legal authorities contend, very justly, that the expert is not bound to submit to this imposition, and

that he is entitled to an adequate fee for his services, for which, however, he should arrange with the party calling him before he gives his evidence.

The English courts, we believe, have not yet definitely settled this matter. We are glad to see that a recent authority (Tidy's Legal Medicine, Part I, London, 1882, p. 17) uses the following pointed language concerning this matter: "No witness can be compelled to give his opinion in the witness box. Further, no one is bound to accept a subpœna merely to state opinions. The witness that can speak to any actual fact connected with the case must attend the trial, if required to do so, but the expert, however wide his experience, cannot be forced to give the court the value of his general or special knowledge. There can be no question as to the propriety and justice of this position; but in this country, the practice of the courts in relation to the compensation of medical experts is by no means settled. In the great majority of our states, the law allows no additional compensation to the expert; and it is not an unfrequent practice to subpœna him as an ordinary witness, and when in the witness box, to use him as an expert. What shall the expert do in such a case? How shall he conduct himself consistently with his own dignity and proper rights? Certainly, the court would not use a man's private property—the work of his hands, his skilled manual labor, or the product of his farm or merchandise—without adequate compensation; why, then, should they expect from him that which is the result of the labor of his brain, than which nothing can be more exclusively and definitely a man's own private property? It is to be regretted that so few of our American courts and legislatures have appeared to recognize the true bearings of this subjeet, so that with us the old practice still prevails of affording no legal protection to the medical expert in the matter of fees." (As

far as can be ascertained, only a few of our States have legislated on this subject.)

In point of fact, however, it rarely happens in important criminal cases, especially in poison cases, that either the prosecution or the defense would venture to trust their interests to a *reluctant* witness; and certainly he would be a reluctant witness who had been dragged, perhaps hundreds of miles from his home and business, by a subpœna which the law forces him to obey, and who, after spending it, may be days in attendance upon the court, is compelled to give, for the paltry pittance of the wages of a day laborer, that which has caused him years of labor and study to acquire, in the shape of an opinion on which may turn the question of life or death of the prisoner; in all such cases the ordinary practice is to arrange beforehand with the expert for his proper fee, and the witness should be admonished to look carefully about his interests in this matter. Let him remember that the District Attorney, who usually directs the affair, has no authority to pay his fee; neither does his authority lie with the court. The only responsible parties in the case are the County Commissioners, or some other equivalent county authorities. With these alone ought the expert to make his arrangements, and always *previously* to undertaking the case; and to these alone can he look legally for his fee.

As regards the obligation of a witness to obey a subpœna, when he is to be questioned only as to his *opinion*, we think that, in this country, the mandate of the court is obligatory. The witness's duty is to obey, and then, if not previously, endeavor to arrange about his compensation, before giving his evidence.

We venture a word of caution to the medical witness. Before undertaking any case, or consenting to act as an "expert" therein, be sure to institute a thorough examination

of all the bearings of the case—its pros and cons. If retained by the defense, the expert has the right to examine the report of the State's expert; and this is of special importance in a poison case. A critical examination of this report will enable him to determine whether he can conscientiously, and on scientific grounds, undertake to contradict and oppose the conclusions arrived at in this report. It is a most serious and responsible position for him to assume, and he ought to assume it only after a deliberate study of the case, and a strict consciousness of his ability to grasp it. If he finds nothing in the report that he cannot thoroughly indorse, whether the results of chemical or other experiments, or whether the deductions from these experiments in the shape of opinions, our advice for him would be frankly to decline the case altogether. He should never go upon the witness stand as a mere partisan, nor offer his professional shrewdness and tact for pay to the highest bidder. If, however, a careful scrutiny of the report has satisfied him that the State has not made out its case, (as far as the scientific evidence goes), but that serious blunders have been committed in the chemical and other experiments performed, whereby most erroneous conclusions have been reached, and which may actually affect the result as regards the accused, then we are of the opinion that the expert not only need not hesitate to take the case, but that it is his bounden duty to do so, in order that he may aid in carrying out the ends of justice.

This whole matter of expert testimony has long engaged the attention of some of the ablest minds in both the professions of Law and Medicine, but with no very definite results. No doubt our present system of volunteer medical experts is open to serious objections, which, under our present laws, cannot be remedied. The only true and proper system, as it seems to us, is for each state to appoint one or more experts,

who shall be state officers, physicians of thorough education and experience, and trained in this particular line, who shall devote their time and attention exclusively to this duty, and for which they shall receive an adequate compensation. Such an office, properly filled, and kept aloof from all political considerations, would, we believe, be of real benefit to the state. It would to a great extent, if not completely, abolish the seeming contention of the experts in the court-room, inasmuch as the State expert (whose professional ability and moral standing should be absolutely unquestioned) would be present at every important trial, and give to the court and jury the results of his previous investigations in the case; and, moreover, since he is to be presumed to be entirely impartial, without bias to either the prosecution or defense, his opinion would be generally received as final by both sides, and thus both contention and expense would be avoided.

The above slightly sketched system of medical expert testimony resembles, in many respects, that of Germany, which we regard as superior to that of other countries. There are a few practical rules relating to the giving of evidence, which it is well the medical expert should observe. The first of these is, that he should prepare himself thoroughly upon all the points bearing on the case in which he is called to give evidence. This he should do in order to further the ends of justice, and also to avoid personal censure. He should be accurate as to weights, measures, distances, size, relationship of objects, etc., never guessing, but testifying with certainty and precision.

Secondly. He should retain a quiet, dignified and composed demeanor on the stand, not exhibiting any irritability of temper, however much he may feel provoked by the rudeness of the opposing counsel. He should beware of any display of arrogance or assumption of manner, or of stubborn-

ness or testiness of behavior, which are sure to make him appear to a disadvantage.

Thirdly. The witness should give his answers in a clear and audible tone, addressing himself rather to the jury than to counsel, since the former are specially interested in his replies, and these replies, together with his explanations, should always be given in the simplest possible language ; they should be free from all ambiguity, otherwise they will require explanation, which is apt rather to weaken the testimony. It will be better also for him to avoid all voluntary remarks and confine himself closely to answering the questions put to him.

Fourthly. He should never be afraid frankly to confess his ignorance if he does not know. Nothing is more dangerous than for a witness to attempt to guess for fear of being thought ignorant.

Fifthly. He should particularly avoid the use of all technical expressions and learned formulas in giving his description of the results of an autopsy or of a toxicological examination, etc. For example, instead of saying that the integuments of the cranium were reflected back so as to expose the calvarium, he should simply announce that the scalp was thrown back and the skull exposed ; and instead of telling the jury in grandiloquent phraseology that in a case of assault and battery he has found that the prosecutor had received a severe concussion over the lower portion of the frontal bone, producing extensive ecchymosis around the eyes, together with considerable infiltration of the subjacent areolar tissue; he should clear up the matter at once by telling them in plain English that the man had gotten a black eye. (Tayler.) All such pomposity and pedantry will, of course, be avoided by every sensible and well-bred witness, since it is certain to expose him to well merited ridicule.

I find that experts alone may testify to the nature and cause of disease. (195.)*

And the following are points of statutory law by which they must be governed, *i. e.*, agreement of, conclusive as to matter in dispute (142) : *

Cannot express opinion on the case under trial. (40.)*

Cannot express opinion as to the merits of a case. (323, 325.)*

May express opinion on hypothetical state of facts. (940, 142.)*

May express opinions on admitted state of facts. (929, 323.)*

May express opinions on matters of science. (324.)*

Skill may be shown by. (224.)*

To testify to facts. (37.)*

To testify as to skillfulness in operations. (304.)*

In A System of Legal Medicine, by Allen McLane Hamilton and others, I get the following (Vol. 1, p. 614, 615) :

"The rule as to the fee of expert witnesses varies with the jurisdiction. In New York, although under the general subpœna a physician must, of course, appear in court and testify of the case within his ordinary observation, he will not be compelled to give his opinion on matters of skill and science. And therefore it is proper for the District Attorney to employ medical experts on behalf of the people. The fact that an expert has received a large fee does not make his testimony incompetent or afford ground for a new trial. But this rule of compensation is not the same, however, in all jurisdictions, and the contrary was held in a laboriously argued Alabama case. Some States have regulated the matter by statute. Thus in Minnesota the judge is authorized to allow an expert witness such fees or compensation as may seem just and rea-

*Civil Malpractice.—McClelland.

sonable, and it might seem, therefore, that such a witness might refuse to testify until he received at least the promise of what he thought a just and reasonable fee. But the Supreme Court held, approving the reasoning of *ex parte* Dement, that this provision of law had reference to an allowance to be made after the witness had been dismissed, not before. In Colorado, if the expert witness testifies under subpœna without making an agreement in advance for his compensation, he is only entitled to statutory fees. The Indiana Code of Civil Procedure provides for compelling an expert witness to testify without extra compensation. But prior to the enactment of this rule, in 1881, the courts of that State had laid down the same rule as in New York. The English rule is that one called as a witness to give his opinion on a subject with which he is peculiarly conversant from his employment in life is not bound to testify unless the party calling him pay for his time. And in a comparatively recent case an auctioneer was said to be a professional witness and not bound to testify, even if sworn, until his fee, expenses or compensation for time, and a guinea a day, were paid."

In Vol. 2 of the same work I find the following summary of Laws governing expert testimony (p. 13–18):

One of the most important and striking developments of modern jurisprudence is in the line of expert testimony. The common law recognizes the right of parties to call as witnesses those who are specially skilled in or familiar with any particular art or science, in order to explain the meaning of words or phrases having a peculiar meaning in such art or science. From this has developed the practice of calling experts in mechanics to give opinions in patent cases, and experts in medical science to give opinions in cases involving medical questions The most important class of cases in which medical experts are called to give testimony is that involving the

issue of sanity or insanity. Many embarrassing difficulties have arisen in cases of this kind as to the examination of expert witnesses, and many well founded objections have been made to the methods employed in such examination in the courts in this country and in England. Some of the most salient objections are to the employing of persons as paid medical counsel by one side or the other; the examination of the experts by hypothetical questions framed in the interest of one side or the other, and the laying down of tests of sanity or insanity by the courts as matters of law, instead of treating the questions as purely medical ones, to be decided by the weight of the expert testimony.

Before considering any of the objections it is proper to state, in a summary manner, what is the general practice prevailing in the courts of England and of this country. To cite authorities in illustration of the practice, or to endeavor to differentiate the practice of the various jurisdictions, or to state the limitations and exceptions to the rules laid down, would involve a treatise. My function is simply to give results and to state the practice in general as it now exists.

In the first place, it is a principle of our jurisprudence that the question of sanity or insanity, when it arises as an issue in the case, is to be determined by the court, or if it be a jury case, by the jury, and is not to be decided by the medical experts.

Again, the question of sanity or insanity presents itself in different shapes in different forms of litigation, and the legal rules as to what constitutes sanity or insanity in the case before the court are laid down by the court for the guidance of the experts as well as the guidance of the court itself or the jury.

Thus in criminal trials, where the accused is defended on the ground of insanity, the courts have laid down certain rules

of law as to what degree of mental or moral obligation is sufficient to shield a man from punishment, and to make him, in a legal sense, irresponsible. The courts have differed widely as to these tests, and no rule of law with reference thereto is universally accepted even now; but nevertheless the courts assume the right to instruct the jury as to what does constitute sufficient insanity to be a defense.

One of the tests laid down by some of the courts has been that defendant must have been so far under the influence of insane delusion at the moment of committing the act as not to be conscious of right or wrong. This test has the sanction of the House of Lords. Other rules are given. But whatever test be adopted, it is well settled in practice that the court is to declare the rule and the jury is bound to accept it. Very severe criticism has been indulged in by some medical men and alienists upon this practice of laying down the test of criminal responsibility and testamentary capacity by the courts. It has been urged that the question of insanity is one purely of medical science and that the test of insanity should be derived from the testimony of the experts and not from the opinions of the judges. This objection assumes that the issue is purely one of sanity or insanity. There are, however, various degrees and phases of mental unsoundness. A man may be to some extent mentally unsound, and yet he may not be in such a condition of mind that, as between him and the community, he should be shielded from the consequences of criminal conduct. So, too, a man may have mental delusions, or weaknesses, and yet not be incapable of disposing of his property. It would seem, therefore, proper that there should be some general rules of law laid down for the various classes of cases where insanity is an issue, and that there should be some guide laid down for the instruction of juries and judges in the different classes of cases. At any rate, such is the practice.

The rule is thus stated by an eminent authority (Wharton and Stille's Medical Jurisprudence, Sec. 193): While experts may be called to testify as to the states of mind and conditions of health, it is for the court to declare whether such states and conditions constitute irresponsibility.

Another well settled rule is that medical expert witnesses may be permitted to state, in connection with their opinion, as to the sanity or insanity of a person, based upon the testimony in the case, the reason upon which it was founded, but inferences from the facts as to guilt or innocence of crime cannot be testified to. Nor can the witness be allowed to testify that certain facts indicate consciousness, apprehension, truthfulness, etc. (See People vs. Barker, 115 N. Y., 475.) Again, another rule observed in the courts on the examination of experts is that their opinion is to be asked, not upon the case as a whole, but upon hypothetical questions presented to them. And it is further the practice to allow each side to call and to pay expert witnesses, and to obtain their opinions upon the hypothetical questions framed by the respective counsels. The thing in which the experts are examined is that they are testifying to the rules of a particular science as applied to a given state of facts. These rules are themselves facts just as much as are the facts testified to by witnesses from their senses of sight and hearing. Then the laws of chemistry may be testified to by a chemical expert. The chemical effects of certain acids, and the results of chemical analysis, for these are as much facts as is the label on a certain bottle, or the name of the apothecary from whom the bottle and its contents were purchased. The primary object, therefore, of expert testimony is not to prove opinions, but facts in the shape of rules of science or art generally recognized by those who are specially instructed in such science or art. In certain domains, however, of science and art, it is possible for men of

equal attainments to differ in their views as to the rules applicable to a given state of physical or mental phenomena presented to them; hence comes the sphere of what is called "opinion evidence." The object to be attained by the courts is to limit the opinion as much as possible, and to get as nearly as possible at the rules generally recognized by the profession of which the expert is a member, and thereby to keep the issue within the realm of facts. This is the theory on which hypothetical questions are based. Where an expert witness has a hypothetical question put to him and he is asked to give his opinion upon the state of facts presented, is in legal theory asked to state what he understands to be the fact with regard to the medical rules applicable to that set of circumstances.

In criminal cases, or cases *de lunatico inquirendo*, it is, of course, feasible for the expert witnesses to personally examine and observe the party, and they can thus form an opinion as to his mental condition at the time of such examination, which they can express in the shape of a conclusion, explaining the grounds on which the conclusion is based. In will contests, however, which form a very large class of the controversies involving the issues of mental competency, this is impossible. In such cases, the hypothetical questions is the only recognized mode of eliciting the testimony of expert witnesses, *i. e.*, a question putting a supposed case based on facts as claimed to be established by the other witnesses, and inquiring if such and such were the facts as to the conduct, character, and history of the deceased, he would be, in the judgment of the witness of sound and disposing mind and memory.

Many forcible objections are urged against the use of the hypothetical question. It is claimed, and with too much truth, that this form of question assumes as proved whatever the counsel putting the question has endeavored to prove, and

combines insignificant with important circumstances, and alleged facts supported by slight and perhaps worthless testimony with other facts of which the proof is strong and convincing, while ommitting still other facts of equal or greater importance which may be overwhelmingly established upon the other side ; that this form of question is in effect nothing more or less than a summing up by counsel, assuming all the allegations of fact in his favor of which there may be only a scintilla of proof, and omitting all other facts, however clearly established. Expert testimony based upon such one-sided hypothetical questions is almost of necessity favorable to the questioner, and the seeming inconsistency of expert witnesses of equal ability and learning is very largely due to this mode of examination. In other words, expert witnesses who might agree if the same hypothetical questions were put to them almost of necessity disagree when directly opposite hypothetical questions are put to them.

The true remedy for the evils that undoubtedly exist in the trial of cases involving the question of insanity is to have this question separately passed upon, as far as practicable, by a commission of experts. Legislation in the State of New York has set an example in this direction. By section 658 of the Code of Criminal Procedure of the State of New York, it is provided that when a defendant pleads insanity, the court may appoint a commission to examine him and report to the court as to his sanity at the time of the commission of the crime. It is further provided that if the defendant in confinement under indictment appears to be insane at any time before or after conviction, the court may, unless the defendant is under sentence of death, (in which case powers are conferred by other statutes upon the Governor to examine into the question,) appoint a like commission to examine him and report to the court as to his sanity at the time of the examination. And

if the commission find the defendant insane, the trial or judgment must be suspended until he becomes sane; and the court, if it deem his discharge dangerous to the public peace or safety, must order that he be committed in the meantime by a Sheriff to a State lunatic asylum, and that upon his becoming sane, he be delivered by the superintendent of the Asylum to the Sheriff, whereupon he must be brought to trial, judgment or execution, as the case may be, or be legally discharged. (Code of Criminal Procedure, Secs. 659–661.)

There are certain cases in which expert evidence is frequently given when it would seem to be wholly inappropriate. Thus in murder cases the accused is very often defended on the ground of momentary or temporary insanity. The defense really amounts to little more than excusable and uncontrollable anger. It is usually availed of in extreme cases, such as when the accused has killed the seducer of his wife. Yet it is manifestly absurd, in such a case, to call medical experts to prove or disprove the proposition that a man who is perfectly sane the moment before the act, and perfectly sane the moment after, can be temporarily bereft of reason by rage and indignation so as to be irresponsible for his acts.

Much criticism has been indulged in by the courts as to the value of expert evidence. Thus Lord Campbell's remark in the case of the Tracy Peerage, 10 cl. & Fin. 191, has been often quoted to the effect that "skilled witnesses come with such bias on their minds to support the cause in which they are embarked, that hardly any weight should be given to their evidence." This criticism is unduly severe. There can be no doubt that the function of expert witnesses is a most valuable one, and is in fact indispensable to the proper administration of justice in the courts.

In Germany, at the present day, both the Civil and the Criminal Code hold to a strict accountability all those whose

office, profession, calling or trade demands the exercise of care, in case death or injury results from the want of proper precautionary measures. In England there are no special statutory provisions laid down defining malpractice, and no criminal law bearing upon the subject, save the common law. All cases of this character are treated in processes before jurors. The latter course is likewise pursued in the United States, as regards both civil and criminal processes; but in this country there is a statutory provision on the subject of criminal liability for negligence or misconduct. In Germany, Austria, and France the trial process is not had before jurors.

DES MOINES, IOWA, May, 6, 1898.

J. O. DECOURCY, M. D., St. Libory, Illinois.

Dear Sir: Yours of the fifth to the Governor of Iowa is at hand. In reply I am instructed to say that we have two statutes governing the taking of expert oral testimony, which statutes are as follows:

SECTION 4620. (Code 1897.) *Handwriting.* Evidence respecting handwriting may be given by experts, by comparison or by comparison by the jury with writings of the same person which are proved to be genuine.

(Part of) SECTION 4661. *Witness fees.* Witnesses called to testify only to an opinion founded on special study or experience in any branch of science, or to make scientific or professional examinations and state the result thereof, shall receive additional compensation, to be fixed by the Court, with reference to the value of the time employed and the degree of learning or skill required; but such additional compensation shall not exceed four dollars per day while so employed. (Ordinary compensation, one dollar and twenty-five cents per day.)

It has been held in our court, "to entitle one to fees as an expert it must be shown that he was called as such and to

testify to an opinion founded on his special study and experience." *Snyder* vs. *Iowa City*, 40 Iowa, p. 646.

Governing the introduction in evidence of documentary evidence we have the following statute:

"SECTION 4618. *Historical and Scientific Works.* Historical works, books of science or art and published maps or charts, when made by persons indifferent between the parties, are presumptive evidence of facts of general notoriety or interest therein stated."

Our Court has held that "standard medical books are admissible as evidence of the author's opinions as to the methods of medical skill or practice." *Bowman* vs. *Woods*, 1 G. Creen, p. 441.

And it is held "that the statutory provision as to medical books does not render inadmissible in evidence that which was before admissible, and standard medical authorities are not therefore the best evidence of what they teach or whether they differ. The testimony of experts is admissible on such points, and also as to what are standard authorities." *Brodhead* vs. *Wiltse*, 35 Iowa, p. 429.

A further holding is, "This provision (the above quoted statute) is not intended to cover medical works of all kinds, and to make them independent evidence of whatever medical opinions or theories are therein expressed or formulated, and does not authorize such works to be read in evidence for the purpose of establishing the probable effects of a physical injury." *Union Pacific R. Co.* vs. *Yates*, 79 Fed., p. 584.

Very respectfully yours,

WM. H. FLEMING, *Private Secretary.*

DEFECTS OF LAWS GOVERNING EXPERT TESTIMONY IN ILLINOIS.

BY SANGER BROWN, M. D., CHICAGO.

The capacity to criticise any subject fairly and to some useful end generally presupposes upon the part of the critic an exceedingly intimate and exact understanding of that subject, both independently and in its various relations.

At the outset, therefore, I have to confess I am not entirely free from the apprehension that a body of physicians may not be well qualified to raise any very valuable criticism as to the best methods of introducing expert testimony into courts of law. It may, however, serve a useful purpose for physicians who have had more or less experience in testifying as experts in the courts to discuss together what may appear to them defects in present methods and suggest a remedy.

In the first place, the critic should have a clear understanding of the general principles according to which a court of law is conducted, and then a more particular knowledge of the principles governing the introduction of testimony in general.

Many of the plans of precedure in common law must be regarded somewhat in the light of sacred relics which have been carefully cherished through many centuries past and must be no less zealously guarded in the future.

It may be pretty safely asserted that injustice will certainly be done in some instances under any plan of procedure, but it will generally be found upon investigation that plans now in

vogue minimize injustice. So long as the elements concerned in reaching a result, or verdict, are fallible, this, too, must be fallible, and while it might be comparatively easy to suggest a remedy for a particular case, it is quite a different matter to make a law which would certainly minimize injustice in all cases.

In view of the foregoing, I am not sure I can point out any remediable defects in the present system of introducing expert testimony in this state. I can, however, easily draw attention to a feature which has, in many instances, excited more or less adverse comment from every one who has observed it. I refer to the spectacle afforded by the experts on one side appearing to directly contradict those on the opposite side. It is claimed that this happens because there is no efficient law to prevent any licensed physician whatever from posing as an expert where a medical question is involved; and, further, that each side hiring its own experts, physicians so employed naturally take more or less of a partisan attitude upon the witness stand, if, indeed, some do not lie very palpably.

Now, no doubt it is desirable that a court requiring instruction from an expert should avail itself of the services of the individual best qualified to render them, and also that he should sustain no relation to either litigant which might tend to render him in the least partial.

It ought to be said, however, that the contradiction of experts in a given case is often much less than at first sight appears. It is to the interest of the lawyers, usually, to emphasize these contradictions, and to this end they construe their questions, hypothetical and otherwise, so that it often happens that while the opposing experts appear to directly contradict each other they do not do so in fact, for they have not each responded to the same question, though the press usually reports them as having done so.

One of the fundamental principles governing a court of law is that each litigant should be free to introduce any witness who is able honestly to testify in his favor, and that each litigant shall have ample opportunity to combat the witnesses who testify against him. Any proposed law which violated this general principle would not, and probably ought not to, find favor, especially in this country, and after all I think by far the greater part of the dissatisfaction with the present plan of introducing expert testimony in this state may be traced to the dishonesty or incompetence of the experts themselves, rather than to defects in the law. If they were asked in the same way to express an opinion upon the same data, no more honest differences would appear, nor no more evidence of partisanship than is observed among common witnesses.

Under the laws of this state every litigant is permitted to support his case by a reasonable number of experts, for whose services he has to pay, but in addition to this, at the request of either litigant, and with the consent of the other, the trial judge may call an independent expert, subject to cross-examination by each side.

Under the present law an expert is usually allowed a fair opportunity to express his views on the case on trial, and if honest and competent, he need have no fear of cross-examination ; but if dishonest and incompetent, he is likely to fare badly and cast discredit upon our profession. Nevertheless, many may be found ready to affirm that it is an extremely difficult matter to insure either competency or honesty by legislative enactment.

EXPERT TESTIMONY.

BY FRANK P. NORBURY, M. D., JACKSONVILLE.

Expert testimony has been tossed ruthlessly on the wave of public opinion in recent years. Not that its value has been undervalued upon the whole, but rather that its practice has been considered too much of a barter and sell procedure. It has unfortunately fallen under the ban of commercialism and the expert no longer represents to the public an untrammeled, unprejudiced witness, but stands in the light of having been committed to defend the rights and interests of the side for whom he is sworn and by whom he is retained. He is supposed to represent the facts of his side in a way that will favorably sustain the opinion advanced by the counsel of the client and to construe these facts under oath.

While this is the picture presented by the lay press to people and by them discussed to the point that such opinion says expert testimony is worthless, yet the courts, counsel and the profession, find after all of this smoke is cleared away, that expert testimony really has value and is essential to the administration of justice, the essential elements of value being, I believe, as Becker expresses it, based upon the three factors: first, what is the value of the expert—meaning his ability and honesty; second, what are the established facts in the case upon which he bases his opinion, and third, what have been his opportunities for examination of these facts?

Upon such a basis the courts recognize the true value of expert testimony, and in the general questions of science and

skill are disposed to give just weight and consideration to an expert opinion when expressed. The lay mind generally undervalues or misinterprets expert testimony because it measures it wholly by its own limited experience ; hence the miscarriage of justice is often the result, especially in questions where insanity is the issue. In Illinois the practice or regulation of the introduction of expert testimony in the courts is much the same as in the courts of other States. The practice has been exposed to criticism simply because of the utter failure to consider the essential elements of the qualification of experts.

One man's opinion is considered as good as another by the jury and many times the brilliant sally and repartee on cross-examination is taken as the criterion of the value of the testimony of a witness. It is exceedingly difficult and impossible to devise or recommend a satisfactory remedy to the present practice of the introduction and value of expert testimony in our courts. Much of the criticism, however, in criminal cases advancing the plea of insanity could be corrected if the courts of Illinois would follow the lead recently inaugurated in Iowa, which practice, however, is not new, for Illinois has resorted to such a practice as has Missouri and other states.

But Iowa has, as I understand, established a precedent which is to govern all criminal practice in that state hereafter. The method is as follows : in a criminal case advancing the plea of insanity as a defense, it will first be necessary to try the defendant on the question of his sanity. If found insane, he cannot be tried upon the criminal charges ; if found sane, then the case shall proceed as in other criminal cases and no testimony in relation to his insanity shall be introduced. This to me seems a fair and just method and will do much to promote the re-establishment of expert testimony upon a basis compatible with the sense of human justice sustained by the public at large.

Legislative enactment cannot change the practice with much degree of satisfaction, as, in my judgment, such a change rests wholly with the courts. Law is, as we all know, not very progressive ; it adheres tenaciously to precedent and dates, as one wag says, much of its precedent practice to anti-deluvian days, when man clothed with but few tribal rights, sought to settle these in a heathenish council. I am not so critical of the courts, but I do believe we need more attention to the needs of modern civilization to the growing sociological changes, where man's relation to man needs the application of the new principles of science and true skill developed with the growth of human knowledge to his conduct. The courts alone can mete out justice from such a standpoint, and we, as integral parts of this sociological whole called the state, should demand more from our courts along this line.

PERSONAL EXPERIENCE WITH THE DIXON DECISION.

BY DENSLOW LEWIS, M. D., CHICAGO.

The opinion of the Supreme Court of this State in the case of J. N. Dixon vs. The People of the State of Illinois was filed November 1, 1897. In Illinois, as far as expert testimony is concerned, the decision in this case is now the law, and to a great extent it determines the law of the land. On account of its importance the case has attracted wide-spread interest and the details are very generally known to medical men and lawyers throughout the country. Nevertheless, it seems advisable in this connection to briefly refer to its salient points as well as to the arguments of counsel and the factors which apparently influenced the Appellate and Supreme Courts in arriving at a decision.

In January, 1895, Dr. J. N. Dixon, of Sangamon county, in answer to a subpœna, appeared in the Circuit Court as an expert witness. He was confronted with a hypothetical question relating to injuries, of which he had no personal knowledge, said to have been sustained by a woman whom he had never known. He was asked as to the probable result of a fall on a defective sidewalk in producing certain injuries, and, after receiving the assurance of the Court that he was called as an expert witness only, he respectfully declined to answer. He explained his refusal to answer "on the ground that an expert witness is entitled to a different and greater compensation than an ordinary witness is allowed, and that an expert is not required to give expert testimony without compensation

as an expert, unless a reasonable compensation shall have been paid or provided for." The Court held refusal to answer as "conclusive proof of contempt of court and of his disposition to persist in such contempt," and imposed a fine of twenty-five dollars. The doctor's attorney, Mr. Conkling, excepted to the order of the Court finding the witness guilty of contempt, and also excepted to the order of the Court fining the witness. He filed a motion for the remission of the fine, which was overruled. An appeal was then prayed to the Appellate Court, which was allowed.

The opinion of the Appellate Court was filed December 2, 1895. The question at issue is thus stated: "Could the appellant, under the circumstances, lawfully decline to give his professional opinion without reasonable compensation?" It is acknowledged that the question has never been directly passed upon in Illinois nor "can any rule be drawn from the currents of judicial decisions in other jurisdictions or from a concurrence in the views of text writers." It is further acknowledged that the contention on Dr. Dixon's part is that "the party desiring his professional opinion should be required to compensate him therefor, before the law should compel him to express that opinion for the benefit of such party." The opinion holds that the Circuit Court ruled correctly in holding the law required the witness to answer the question. It is stated that the statute has fixed the compensation to be paid all witnesses and "the law requires every person, when duly subpœnaed, to appear as a witness and accept as full compensation the statutory allowance, however inadequate it may be."

It is held that the administration of justice in the adjustment of the contentions growing out of the business affairs or concerning mere private personal property is "one of the most important sovereign duties devolving upon the State.

This duty can only be discharged through the medium of judicial tribunals and these tribunals would be powerless to perform their functions if they could not compel witnesses to attend and disclose facts in their knowledge pertinent to these contentions." It is further held that no distinction can be drawn between different kinds of knowledge, nor can a witness "decline to make known facts which have come to his knowledge either by observation or study and experience upon the ground that he can use such facts or knowledge for his pecuniary benefit in the business affairs of life, when the disclosure thereof is important to the attainment of justice in the courts." It is then stated that some books on expert testimony enumerate as many as seventy classes of expert witnesses and it is asserted that it would subject a litigant to great financial burdens if each member of these different classes of witnesses had to be paid a reasonable compensation "before he could be compelled to disclose in open court facts in his knowledge relating to the right and justice of causes there pending for determination."

The Appellate Court, in affirming the judgment of the Circuit Court, takes occasion to state that knowledge gained by study, observation and experience is not property within the meaning of the word in the sense that "private property shall not be taken or damaged for public use without just compensation." The word property, it is asserted, means "tangible things and rights which accompany or are incident to the use, enjoyment or disposition of such things."

In June, 1896, this case came up to the Supreme Court on a further appeal. The brief of Dr. Dixon's attorneys, Messrs. Conkling & Grout, is a learned dissertation concerning medical expert testimony in the different states. It refers also to the customs of the ancients and quotes from authorities and practices of almost every civilized country. Their argument is

concise and scholarly. They state the fact emphatically that in the case at bar there is no involvement of any question of government, of crime against the laws of the State, or any matter which might be included under the right of taxation or the police power. They say: "A citizen having no knowledge of the facts in controversy, no interest directly or indirectly in the result of the suit, is compelled to yield up without compensation the fruits of his study, skill and experience, that one of the parties litigant may recover a larger sum of money, or that the other may escape the payment of such sum. As well might the farmer, the merchant or the manufacturer be required to contribute of his property at the call of any litigant who might fancy it would be to his advantage to have it."

They further show that no question of the duty of the citizen to the State is involved, nor is there the refusal of a witness to testify to facts in controversy within his knowledge. There is purely and solely a question of expert testimony which, it is endeavored to prove, is either property or "particular services." Under either view, it is asserted, that a citizen under the circumstances in question cannot constitutionally be required to give expert or opinion evidence without full and just compensation being made for the same.

The decision of the Supreme Court in this case is well known. It was decided that a physician, when subpœnaed and interrogated as an expert witness, may be compelled to testify without pay other than the statutory fee. He must testify in civil as well as criminal suits since "in either case the object is to promote public justice and insure the peace and good order of society." If he refuses to testify, when regularly subpœnaed and placed upon the witness stand, the Court is justified in fining him for contempt.

In the opinion of the Supreme Court, delivered by Mr.

Justice Magruder, it is stated that the grounds upon which the right to extra compensation has been sustained are generally three in number: First, it is claimed that the time of the expert witness is more valuable than the time of ordinary men and that, by attendance at Court to give his testimony, such a witness meets with a loss of time. The opinion is given that any ordinary witness who goes to Court and testifies as to facts is subjected to a loss of his time as much as a witness who goes there to testify as an expert upon a mere matter of opinion.

The second ground upon which the claim for extra compensation is based, is that the skill and accumulated knowledge of the expert are his property and that a man's property should not be taken without just compensation. It is asserted that it is not accurate to say that the mere abstract knowledge, acquired in the study of a special employment, is of itself property. "It is the right to apply that knowledge to the accomplishment of a particular result which constitutes property." If the witness, for example, had been required to answer a question with the view of prescribing a remedy for the woman who was injured, then it might be said, if he was not offered any compensation, that he was deprived of a property right. "But when a physician is asked a hypothetical question, and is called upon to give his opinion upon the facts stated in the hypothetical question while he is testifying as a witness in Court, he is not thereby required to practice his healing art. He is merely making a statement, not for the purpose of effecting a cure, or relieving a patient, but for the purpose of enabling the Court and the jury to understand correctly a case which is before the Court."

It is conceded that, in a certain sense, the knowledge of the physician, acquired by special study, is property, but it is added, "the question here is not so much whether certain

knowledge is property as whether the requirement that he shall answer a hypothetical question is a taking of his property." It is further stated, and right here is the important point in reference to my own experience, that "where he is required to make an application of his knowledge to a particular case, so as to secure a particular result, such as, for instance, the curing of a disease, or the healing of a wound, then he would undoubtedly be entitled to compensation. A physician or surgeon cannot be punished for a contempt for refusing to make *post mortem* examination unless paid therefor, nor can he be required to prepare himself in advance for testifying in court by making an examination, performing an operation, or resorting to a certain amount of study without being paid therefor.

The third ground for extra compensation is that the accumulated knowledge and skill of an expert witness may be treated as "particular services," and it is explained that while such a construction of expert testimony may hold good in Indiana, it does not apply to Illinois, because the ordinance of 1787, wherein those words are found, is not in force in this State.

The Supreme Court concludes by quoting and endorsing the views of the Texas Court of Appeals as follows: "It is to be regretted that a member of a profession, so distinguished for liberal culture and high sense of honor and duty, should refuse to testify in a case pending before the courts of his country, involving the life and liberty of a fellow being, and the rightful administration of the laws of a common country."

Now, this is the decision in the celebrated Dixon case. Much might be said in criticism of the opinion of the Supreme Court, but it is, I suppose, useless to do so now. This decision has become the law, and the duty of every citizen is to obey the law. In fact he has to do so or suffer the conse-

quences. It is now possible for every pettifogging attorney to call to his aid in the most trivial case in any court the most eminent man in the medical profession. The engagements of such a man are not to be considered. He must leave the most important case to attend the behests of any attorney who may wish to dignify his cause by the presence on the witness stand of some noted physician or surgeon. He will receive one dollar a day and five cents a mile for traveling expenses. His absence may cause him to lose hundreds of dollars, but the "member of a profession, distinguished for liberal culture, etc.," will not of course take exception to a mercenary matter of this kind. His high "sense of honor and duty" will amply console him. Possibly he may be of a philosophical turn of mind so that he will duly appreciate the value of an enforced engagement of this kind as an opportunity for enjoying a much needed diversion.

But I will say no more in explanation or criticism of the Dixon decision. Every medical journal in the country has been up in arms against it. Every medical expert has protested. It is useless to inveigh against it, for it is the law which we must all obey.

Unfortunately, this decision appears to have far-reaching consequences which as yet we have not dreamed of. Not content with depriving the medical man of his fee whenever he is put upon the witness stand by due process of law, that is, by subpœna, if my experience counts for anything, it would appear that this decision is to become the basis for depriving him as well of numerous other rights which other citizens hold under the law of contracts and the principles of equity. Let me relate the details of my case as far as it has gone:

In the summer of 1890 I was called to treat Emlen S. Blye, a woman of uncertain age and unknown antecedents. She was injured in the knee on a suburban train of the Illinois

Central Railroad and suffered severely from her injuries for some little time. While I was treating her, she told me that she intended to bring suit against the railroad company and asked me to do everything in my power to help her. She said her attorney claimed that she could recover at least two or three thousand dollars, and in that event she promised to see that I was well paid for anything I might do for her.

She wished me to advise with her attorney Col. Southworth, which I did on some ten or twelve occasions. We conferred as to the best way to present her case. It was, of course, evident that if the injury was permanent, it would prevent her from earning her living as a teacher of the Delsarte method, which was her occupation prior to the accident, and consequently she might reasonably claim heavy damages.

I suggested to Col. Southworth the advisability of having Mrs. Blye consult Dr. Charles F. Stillman, now deceased, but at that time a well-known orthopædist. My object in this advice was to secure for the patient the benefit of this specialist's skill in the treatment of the injury to her knee, as well as his testimony in her behalf on the witness stand. For several months she was treated by him and by Dr. A. B. Hosmer, associated with him, but without appreciable benefit.

The day of the trial drew near. Col. Southworth and I deliberated as to the conduct of the case. We considered the advisability of subpœnaing Dr. Fenger. There was, in my mind, a suspicion of tuberculosis. I feared if Dr. Fenger were placed upon the stand the question of tuberculosis in reference to the patient's injury to the knee might be raised, and I questioned the effect of his testimony upon the jury. By my advice he was not called. Dr. Stillman's ill health necessitated the use by him of a large quantity of morphine. I feared the result of a cross-examination in his debilitated condition and advised Dr. Hilton, who had kindly seen the patient a few times in my

absence, should be the only practitioner, besides myself, who would testify for Mrs. Blye.

In the summer of 1891 the case came to trial. I was not subpœnaed but was present the first day and gave my testimony as to the facts as far as I knew them. I also gave expert testimony as to the probable relationship of the injuries sustained to the accident which had occurred. I further stated that in my judgment the injuries sustained were permanent.

The second day I received a telegram from Col. Southworth asking me to come to court immediately. He thought it probable medical experts would be put on the stand to contravert my testimony. He wished me to be present to assist him in the examination of these witnesses. On the receipt of this telegram I left everything and hurried to the court room. No medical witnesses appeared during the morning session. When court reconvened in the afternoon I was present and remained in attendance until it became evident that no expert testimony would be offered by the railroad company.

The result in this case, after all appeals had been taken, was a verdict for $9,000.00, which the patient received, and which at that time was one of the largest verdicts ever sustained in a a personal injury case.

I was absent in Europe at the time Mrs. Blye was paid this money. She wrote my partner for a bill for professional services. This he made out at a nominal figure for all services not connected with her lawsuit, and she paid it. He knew she claimed to be poor, and was ignorant at the time that she had recovered in her suit against the railroad company. I had simply marked the word "special" in our ledger in the space corresponding to the date of her trial, and no bill was sent her for services rendered by me in and about her lawsuit. I confidently expected, when she recovered a verdict so

much in excess of her most sanguine expectations, that for the services I had rendered she would gladly give me at least $500.00.

But, alas for my confidence in feminine gratitude! In the summer of 1893 I saw Mrs. Blye, like Maud Muller, more or less gracefully raking the grass in front of an apartment building she had built with the proceeds of her verdict. I stopped my horse and complimented her on her own healthful and cheerful appearance and on the substantial character of her building. Incidentally, I made bold to remark that I had not been paid for my services in her case. She now waxed indignant. She said her attorney was everything that was vile and intimated that I was no better. I remonstrated gently but ineffectually and left her to her horticultural pursuits.

Subsequently I communicated with her. I sent her a bill for $100.00 for my services. I wrote her, but to no avail. Finally, in 1895, I sued her before a justice of the peace and secured judgment for $100.00 and costs of suit. She took an appeal, and on December 17, 1897, the case came to trial in the circuit court of Cook county before his Honor, Judge Richard S. Tuthill. I here secured judgment for $2.20, the statutory fees for an ordinary witness in any case.

Now, the proceedings in this case are interesting. My attorneys, Messrs. Church & McMurdy, showed that I gave expert testimony and assisted the counsel in preparing for trial. Mrs. Blye's attorney admitted that I had testified in her suit against the railroad company, that I had not been subpœnaed, but attended voluntarily, and was called as an expert witness. He claimed that I was entitled to nothing but what the statute provides, but he also admitted that if I was entitled to anything over and above the statutory provision, I was entitled to $100.00. I then testified regarding my connection with the case, as already narrated, and in answer to a

question from the court I said that I considered my services worth $500.00, but I sought to recover $100.00 only. It was admitted that Mrs. Blye had received $9,000.00 after her case was affirmed in the Appellate Court. She offered no evidence.

My attorneys then asked the court to hold the following propositions of law:

1. That a valid contract may be made with a physician to assist the attorneys in a suit at law in the preparation of the case, whereby the physician is to be given extra compensation therefor.

2. That a valid contract may be made between a party to a suit at law and a physician for the payment to the latter of a compensation beyond statutory fees in consideration of assistance rendered by him to the attorneys of the party in the preparation and trial of the case.

Both of these propositions were held by the court, but the court refused to hold—

1. That the contract in my case was valid.

2. That a person may make a valid contract with a physician by which it is agreed that the physician shall be paid extra compensation for his services in testifying as an expert in a suit at law.

3. That I was entitled to recover of the defendant the sum of $100.00.

It was further held that I was entitled to receive the sum of one dollar for each day's attendance, and five cents per mile each way for necessary travel when attending court as a witness, and no more. Judgment was given for $2.20, and I have appealed the case to the Appellate Court where my appeal is now pending.

The learned judge seemed much interested in the Dixon decision, which he then saw, as he said, for the first time. He

told us that he had nothing besides my case to consider that afternoon, and for our edification, I presume, he read aloud the report of the Dixon decision from a copy of the Illinois Official Reporter which my attorneys handed him. When he had finished, he announced that there was nothing more to be said. His attention was called to the fact that I had not been subpœnaed, that I had assisted the counsel, and to other facts in the case, but all to no avail. He seemed to take the view that the Dixon decision settled all matters relating to medical testimony, and that the statutory fee must cover all claims of every kind that a medical witness could possibly make under any circumstances in any case.

I cannot consistently or conscientiously accept this conclusion. The sum of money involved in my own case is only $100.00, and it is doubtful if I receive a dollar of it, even if, in the course of time, the Appellate Court decides in my favor. I am given to understand that the $9,000.00 received by Mrs. Blye in 1892 has now been dissipated in one way or another. Nevertheless, I feel there is here a principle at stake, and I believe it to be my duty, under the circumstances, to maintain the privileges of the citizen which are not sacrificed when he becomes a medical man. I consider that the Dixon decision has been used to abridge my personal rights, both as an individual and a physician. I therefore consider it but just for me to do all in my power to prevent what I regard as further injustice being done to members of the profession who may happen, in the course of their practice, to act in the capacity of expert witnesses.

The brief filed by my attorneys in the Appellate Court shows the two questions involved.

1. Where a suit at law involves an inquiry into questions concerning any particular science, as to which the opinions of experts in that science are necessary or competent evidence,

can an expert witness, who at the request of a party, and upon promise of compensation beyond statutory witness fees, has conferred with the attorneys of such party in advance of the trial for the purpose of advising them in reference to the character of his testimony and assisting them in preparing for its proper presentation to the court and jury, and has then, without subpœna, attended the trial as a witness and given his opinion as an expert upon the matters submitted to him upon the witness stand, recover from the party employing him the larger compensation promised?

2. Where, in addition to the particular services above described, and upon a like promise of compensation, the expert has consulted with the attorneys for the party employing him in advance of the trial, and advised them as an expert generally upon its conduct in reference to the questions of science involved, and attended at the trial for like purpose beyond the time necessary for his attendance as a witness merely, can he recover the larger compensation promised?

Many authorities are quoted to show that expert witnesses should be paid for their services. The radical fallacy of the argument based upon a supposed public duty is clearly expressed as follows:

"That it makes the obligation of the particular citizen to perform the particular duty depend upon his arbitrary selection for that purpose by a private and irresponsible individual out of a multitude of his fellow-citizens, and by punishing him for a failure to obey that designation, virtually places his liberty within the arbitrary and unrestrained control of any one who chooses to exercise it. The process of the court is signed and sealed by its clerk in blank, and delivered to any applicant."

It is admitted that since the Dixon decision the question, in the bald form just presented, must be regarded as settled.

But, my attorneys add, "it would be manifestly erroneous to burden that opinion with any purpose beyond that which was necessary to the decision of the particular question there before the court, which was expressed in the syllabus in these words, namely: 'A physician subpœnaed and interrogated as an expert witness only, can not refuse to testify upon the ground that no compensation greater than that allowed to ordinary witnesses has been paid or promised to him.'"

The differences between the Dixon case and mine are then stated as follows:

1. In the Dixon case the expert attended in pursuance of a subpœna.

In my case I attended upon request of one of the litigants.

2. In the Dixon case, the witness being sworn, refused to testify on the ground that he had neither been paid nor promised extra compensation, and the court held that this was not a valid reason for refusing to testify.

In my case the extra compensation had been promised and the services rendered, and the only question is whether the promise is one which can be enforced.

3. In the Dixon case, so far as appeared, the only service which the expert was called upon to render was to answer the questions asked of him as a witness upon the stand. No preliminary preparation was required, no conference with counsel, no advice to counsel in preparation for the presentation of his evidence to the Court and jury.

In my case all of these are essential elements of the proposition.

Now, in the Dixon case the Court expressly said: "A physician or surgeon cannot be punished for a contempt for refusing to make a *post mortem* examination, unless paid therefor, nor can he be required to prepare himself in advance for testifying in Court by making an examination or performing

an operation, or resorting to a certain amount of study, without being paid therefor."

So that it is evident that the decision of the Dixon case neither directly nor indirectly controls the decision of my case, except in so far as the paragraph just quoted may be considered to uphold, as it undoubtedly does, my contention.

This all seems very clear to me. I fail to understand how any one can take a different view. My only explanation is that the learned judge before whom this case was tried seems to have fallen into some strange misapprehension concerning the real point involved. He admits that a valid contract may be made between a litigant and a physician by which it is agreed to pay a physician for assisting counsel in a case, and the undisputed evidence shows that such a contract was made between Mrs. Blye and myself. Nevertheless the Court refuses to hold that the contract between us is valid. He rests on the Dixon decision and appears to think that decision decides everything so far as medical experts are concerned. I venture the opinion that he will not be upheld by the Appellate Court unless upon some technicality.

Now here is my experience with the Dixon decision. It is not yet complete, but I confess it is a sufficient experience to satisfy me. Much might be said in this connection. I content myself with the expression of but one practical thought. The truth is not what is sought in any law suit. Each side tries to win. The most brutal murderer, if he has means, will retain an eminent attorney to save his neck if possible, and if not, to secure as lenient a sentence as possible.

It is considered consistent for an attorney, whatever may be his personal ideas on any subject, to act in a professional capacity for any client who can pay for his services. It is well known that few attorneys will refuse a fee from any client provided it is sufficient in amount. I know an elder in the

church near me who is a rabid temperance man, and yet I remember when he defended a saloon-keeper who was arrested for selling liquor without a license. I happened to hear him talk to the jury, and I was amused when he asserted that the saloon was the only place where the weary pedestrian could rest. I have a very dear friend who is the attorney for several corporations. He is a populist—almost a socialist—and in public addresses he condemns trusts and corporations. In his professional capacity, however, his services are given to the corporations he bitterly and vehemently denounces.

Certain medical men in their professional capacity are called upon to do medico-legal work. This is legitimate practice. Indeed, it demands, in some instances, a very high degree of medical knowledge, great perspicuity, as well as perspicacity, and a mind trained to logical reasoning. It is absurd and untrue to say that medical men when called to testify as experts are solely seekers after the truth. It would be as sensible to assert that lawyers in their controversies were actuated solely by a desire to see justice done. Lawyers try cases to win. In certain instances they require the assistance of experts who may be members of one profession or another, or who may have acquired special knowledge in some department of technology. Lawyers, or the individuals or corporations they represent, employ these experts for their own benefit. They make use of the peculiar knowledge of the expert to further their own ends.

It does not follow that the expert becomes at once a knave and a liar because he is necessarily somewhat partisan. He gives his services to a certain case for a suitable consideration. His peculiar knowledge and his experience enable him to give definite data to the attorneys upon which they may adopt a line of conduct in their judgment best calculated to win.

I was called on one occasion in a case where a woman was

thrown to the floor of a street car in consequence of some accident to the cable. Six months afterwards she submitted to an operation for pyo-salpinx. She claimed that infection of the tube had occurred as a result of the accident. The attorneys for the street-car company called together some six medical men for consultation. They were men who possessed special knowledge in pathology, surgery and gynæcology and whose experience was well known. The details of the evidence were laid before us. It soon became evident that a condition such as represented by the plaintiff was an impossibility. We could surely and truthfully say that a pyo-salpinx could not develop in a perfectly healthy woman as the result of an accident which did not cause penetration through the abdominal wall, the vagina, rectum, bladder or uterus. It was conceded that, if the woman was already infected, if she had gonorrhœal salpingitis, for example, it was possible for an accident to aggravate her condition, and it was possible that under these conditions a pyo-salpinx might ensue as the result of the accident. We were able to say that, so far as we knew, no case was on record where a pyo-salpinx had developed as claimed, and we were in a position to testify that we had operated on many hundreds of such cases.

Our advice to the attorneys was to the effect that in their conduct of the case the fact that the woman was perfectly well prior to the accident should be emphasized. We suggested that the usual etiology of such cases in relation to gonorrhœa and abortion should be fully brought out. This was done and the verdict was satisfactory to the street car company. The medical experts were paid for their services. Some of them were paid only for the consultation and others were paid for the consultation and for testifying in court.

Does any one pretend to say there was here any impropriety, any prostitution of medical knowledge for gain? I contend

that it was legitimate for the medical experts to make use of their peculiar knowledge. I hold that the assistance they gave counsel in this case was of material benefit and that such assistance could only be obtained from duly qualified medical men.

Of course, it must be acknowledged that medical men may be dishonest. It does not follow that they become so simply because they give expert testimony or assist attorneys in the preparation and presentation of cases. I was recently asked to testify that no displacement of the uterus could occur by a fall. I was told that several eminent practitioners were prepared to swear to this effect. I at once replied that I could not testify as requested and my services were not called for in that case.

As a matter of fact, there are disreputable men in every walk of life. It would be unfair to say that they do not exist in the medical profession. At the same time, there is a legitimate sphere of usefulness open to physicians in the field of expert testimony. It is as honorable a specialty as gynæcology or ophthalmology, and it is as unjust to claim that all medical experts are dishonest as it is to accuse all gynæcologists of being abortionists, or to class all occulists with itinerants who sell "eye water" throughout the country districts.

It is admitted that the laborer is worthy of his hire. It must be acknowledged that the medical expert is entitled to adequate compensation for services which are often indispensable. The law ought not to prevent a man from collecting what is rightfully due him. The Dixon decision may be the law of the land. It is legal, but no power on earth can make it right. An enlightened public sentiment founded on principles of equity will in time assert itself. The medical expert will then be recognized as an important specialist in the practice of medicine and his rights will be respected.

EXPERT TESTIMONY: SUGGESTIONS FOR THE OUTLINES OF A LAW.

BY D. W. GRAHAM, M. D., CHICAGO.

In theory, what I have to say should be based upon the information furnished by the several preceding papers on this subject and should be the result of these discussions and conclusions, but as I have not had the benefit of these so as to make them available for present purposes, there is some risk of what might be called in classic phrase a *non sequitur.*

In the minds of those desiring legislation on the subject of expert testimony there are two distinct things to be accomplished. One pertains to compensation of the expert witness, and the other looks toward some method of securing impartial testimony of such character as will command the confidence of all concerned.

In outlining or framing a bill that will in any degree accomplish which is desired and at the same time will meet the approval of the majority of those most interested, there are several points to be considered:

First—The scope. Should such a law be applicable to all kinds of expert testimony or only to medical? Should it be applicable in both civil and criminal trials? Should it apply throughout the State or only in the larger counties, as, for instance, those having not less than a given number of inhabitants? So far as it is a constitutional question, I am assured by high legal authority that a law framed in accordance with either the affirmative or the negative of these propositions

could not be construed as class or special legislation, such as is prohibited by our State constitution. So far as my own judgment and information go, it would be expedient, if not desirable, to limit the application of such a bill to medical testimony, and that to make it apply to both civil and criminal cases and throughout the State rather than to the larger counties would be both desirable and expedient.

The *second* point relates to qualifications. It would seem desirable that the bill should specify certain qualifications for the expert witness, such as a minimum of experience, special study, residence, etc., and if it were to be applicable only in the large cities it would be expedient also. But too many specified requirements would excite opposition in many localities and would endanger the success of the bill as a whole. The question of qualification could be left almost wholly to the judge and counsel to determine by a preliminary examination, much after the manner of determining the qualifications of jurymen.

Third—How and when appointed? The presiding judge in any case on trial involving medical testimony should be authorized, in his discretion or on the application of counsel for either party, to appoint or subpœna one or more physicians as medical experts, who shall be designated as court witnesses. The question arises whether the judge *shall* or *may* so appoint when either party to the suit applies to have court witnesses appointed. It would seem desirable to make it compulsory, but probably it would be expedient to leave it to the discretion of the judge.

The *fourth* point concerns what may be called the status of a court witness and his relation to other witnesses. He should be subject to the same rules as other expert witnesses and be examined and cross-examined in the same manner, and the bill should provide that the rights and privileges hitherto en-

joyed by litigants should not be abridged in any degree by reason of the appointment of court witnesses.

Fifth—Remuneration. The fees provided for witnesses by the bill should be moderate and must be so if it ever receives any consideration at the hands of our law-makers. Probably they should be fixed by the hour rather than by the day, say not less than $5.00 nor more than $10.00 for each hour actually in attendance.

The recent decision of our Supreme Court in the Dixon case, in which this Society took active interest, makes it the law of the State that the expert witness is exactly on the same footing as other witnesses, both as regards fees and compulsory service and in both civil and criminal cases. The argument of the Court commands our highest respect and is in marked contrast with that of the trial court, but to one not learned in the law it looks like stretching a point to declare that there is no inherent property right in the opinion of an expert which anyone who wants it is bound to respect. We are left to infer that this can be changed, however, by statute law.

Probably there is more demand in the medical profession for legislation to correct this defect in our laws than for that to help secure better and more impartial expert testimony. If so, the proposed bill should have a provision for the reasonable compensation of experts in general under certain conditions, or at least the class of medical experts not provided for in this bill.

But there will always be decided opposition in the Legislature to any bill that will materially increase the expenses of our judicial proceedings.

It should be remembered that there is not unanimity in the profession in favor of the legislation, our subject contemplates. Some have written and argued strongly against all

such legislation. The essence of the argument is that it is not possible by law to prevent the ignorant, the incompetent and venal members of our profession from posing as medical experts when their services are required by shrewd or unscrupulous attorneys with desperate cases.

But the evils are not wholly along these lines. Under our present plan, the defects of which may be more or less inherent in our form of government and system of jurisprudence, the expert witness is almost precluded from giving an impartial and judicial opinion, however honest his desire to do so. To use an old and familiar illustration, he is shown the silver side of the shield and his opinion of the nature of the metal is extracted in due form and accords with the limited view presented to him, while the expert of the advocate of the party of the other part is given also a circumscribed view of the shield, that is, the gold side, and he solemnly swears that the shield is made of gold. It is only the all-around view that will allow of a correct opinion. No doubt the difficulties of framing a bill that will be generally acceptable to the members of both the medical and legal professions will be great, yet they should not be insurmountable. Any law that will in any manner help to correct the present evils, pertaining to expert testimony with which the medical profession is charged, but for which they certainly are not wholly responsible, will be a relief.

DEFECTS OF THE LAWS OF THIS STATE GOVERNING MEDICAL PRACTICE.

GEO. N. KREIDER, A. B., M. D., SPRINGFIELD.

Perhaps longer and more intimately than any one person here present I have been in a position to observe the working of the medical laws which have been enacted from time to time in this State. Perhaps no one has undergone a more radical change of opinion of their value and necessity than I have. I have long since come to the conclusion that the really well educated man has little to gain from the working of any law. And yet of course I realize that for our profession as a whole the laws are necessary. What I wish to emphasize here is the fact that the enactment of no law will *per se* drive the horde of charlatans from our borders. No law which has ever been enacted as yet has done it, notwithstanding the claims made by the late distinguished secretary of the board, Dr. Rauch. And furthermore I can not imagine the wording of a law so strong or its enforcement so strict as to do this.

We have been lectured so many times by our German and French confreres as to the excellence of the laws in those countries, that we have come to the conclusion that laws had been enacted in those countries which were a protection to the public and the profession. But from my recent reading of medical journals of Berlin and Paris I am in a position to say that such ideal conditions do not exist and that even a worse state of affairs is found there than here. In the State

of Saxony, one of the most enlightened and prosperous provinces of the empire, quackery is rampant. For every four legal practitioners there is one unauthorized and incompetent quack.

These are classed as homeopathists, natural doctors, bone setters, baunscheidtists, faith healers, herb doctors, etc., etc. I have no doubt that the law in Saxony is an excellent one, probably the best that could be enacted, and yet along side of this law there has grown up an army of law breakers who cannot be reached by the courts because of the sympathy of the people. You will notice that homeopathy is included in this list because it is a fact that the disciples of Hahnemann have never gained a legal status in the land of his birth.

To be fooled as to his ailments is one of the inalienable rights of every citizen, and one which I may truthfully say he will never give up. If he is not fooled in one way he is in another, and that's the end of it. This blindness, as you well know, is not confined to the ignorant part of the population. The most intelligent class are found among those who go to the extremes and absurdities of the faith cure and mind cure.

Many defects have been found in the old practice act which I will now enumerate. Many of these defects will be eliminated when the new law is passed, and yet I am sure the wily attorney will find defects in any law which we may be able to get through the Legislature. For the defects in the old law, which I am about to mention, I am indebted to Dr. J. A. Egan, Secretary of the State Board of Health.

First—It fails to state what the Board shall do in the case of graduates of colleges not in good standing.

Second—It states the fee to be paid by a graduate or licentiate in midwifery but does not prescribe the qualifications to be possessed by said graduate or licentiate.

Third—The full fee for examination should not be returned in case of failure to pass. In case of success or failure the same labor is involved by the Board in making the examination.

Fourth—The penalty for violation of the act should not be recoverable in an action of debt, but the offense should be considered a misdemeanor, and be punishable as such. Many of the offenders have no means, and furthermore, the process in action of debt is too slow and cumbersome.

Fifth—SECTION 13. Judgment on conviction and appeal is very defective. The time of imprisonment—30 to 90 days—should be stated. As it now stands, the sentence is indeterminate.

Sixth—It should be the duty of the State's Attorney to prosecute all violators of the act, presented to him. As it is now the Board has to bargain with an attorney to prosecute, he accepting the resulting fines, viz., $100.00 in lieu of fees. If the case is appealed the attorney gets nothing until the matter is decided and his remuneration is the same if no fine is paid. Hence, attorneys take charge of cases very unwillingly.

NEEDED MEDICAL LEGISLATION IN ILLINOIS.

BY HAROLD N. MOYER, M. D., CHICAGO.

We shall not discuss the desirability or necessity of medical legislation. Nearly all civilized countries and almost all the states and territories of the American Union have medical practice acts, and this in itself would seem to settle the question of the necessity of such laws. Whatever opinions we may hold regarding the value of them is apart from the subject assigned me in this discussion. Therefore it will be assumed that such laws are a needed protection to the public and ought to be placed on our statute books. This much being conceded, there remains only the question as to what the character of such a statute should be.

Among the laity and even among the profession there is a feeling that a license to practice medicine conveys a franchise, a something not inherently belonging to the individual, and which he did not possess before receiving it. This was even expressed by one of our judges, who speaking from the bench said physicians were favored of the State, inasmuch as their occupation was conserved by legislation. A greater error could not have been made. The right to aid the injured or help the sick is a common law right and has been possessed by man since the dawn of reason. Whatever of skill one may have had in these directions could be offered to suffering humanity for hire without let or hindrance. A medical practice act and its attendant license is only an inhibition and a limitation of a right existing from time immemorial.

As a people become aggregated and employments specialized their interdependence is greatly increased. Consequently there is a wide extension of the police power. The increased size of our cities and towns has created the necessity for a common water supply, sewage disposal, lighting, etc. If epidemics are to be avoided proper sanitary arrangements must be enforced, and these come within the police power. A public health service can only be administered by a body of trained medical men, and it is clearly within the police power to determine the qualifications of such medical men. The convenience of the public requires that, at one time and another, every medical man may exercise the function of a public health official. In giving a certificate of death, of vaccination or reporting contagious diseases, he is performing acts which may be fraught with grave consequences to the public health. Nothing could be clearer than the power of the State to delegate these functions alone to those whom it regards as competent and trustworthy.

We thus see that the sole purpose of a medical practice act is to conserve the public health and to prevent fraud, such as a man passing as a physician who has no medical training. No other purpose can be subserved by such an act, and it in no way adds anything to the rights of medical men. If there is any feeling in the profession that an act should be so drawn as to protect the medical man in his occupation, it should be dismissed at once, as no law drawn upon such lines would stand the scrutiny of our higher courts. The sole object of such a law being the conservation of the public health and to prevent fraud, it is easy to see on what general lines such legislation should be cast.

Illinois was one of the earliest States in the Union to formulate a medical practice act. In that early legislation there were serious defects, the most important being the consolidation of

the licensing body with the Board of Health. Another and still more serious error was the recognition of diplomas, and the attempt to distinguish between schools which reached certain requirements and those which did not. Undoubtedly this was the best that could be done at the time, and under the able direction of Dr. J. H. Rauch, even this defective statute did a great deal to elevate the standard of medical education.

The first requisite of a new statute is the separation of the public health and licensing body and the creation of a licensing body that shall at once eliminate the diploma as a basis of qualification and substitute a State examination. So far the framing of such a law is easy. The greatest difficulty is in defining what constitutes the practice of medicine within the meaning of the act. In some European countries this difficulty is met by placing the definition within the more or less arbitrary keeping of a certain official. Under our constitutional system it must be placed in the statute. So far as we know every American statute has attempted to define the practice of medicine and has attached penalties to their infraction. It is in the inherent difficulties of this definition that trouble in enforcing the law arises.

The thought has occurred to me that this difficulty might be met by a simple designation or trade mark, such as the letters "L. G." placed after a name to indicate that an individual was a licensed graduate. The law might attach penalties for the unlawful use of these letters, and not attempt a definition of the practice of medicine. This would act as a notification to the public that persons so designated had a certain standard of qualification, and would restrict to them all official acts and employments relating to the public health. It would conserve to the public the right to employ quacks and charlatans to their heart's desire. Some may question the wisdom of allowing quackery a free hand, but they should

remember that it is a God-given right for persons to make fools of themselves if they wish to do so. No statute that could be drawn would prevent my employing a man to sit with his back toward me and think my diseases away, or pray them away, or to infect me with personal magnetism, nor can it prevent my paying him for his services. Any attempt to do so would be a gross invasion of personal liberty not to be tolerated in our country. Consequently, no medical practice act which can be drawn will stamp out quackery. The protection of the public requires that a man should not be able to pass himself as an educated medical man. Then if a man employs an unlicensed person to treat him he does so with a full knowledge of the facts, and there would be no fraud. Such protection would be met by a simple designation as indicated. Such a statute could be easily enforced and would avoid the cumbersome and necessarily defective definition of the practice of medicine. It would be a wide departure from the lines followed in this class of legislation and would seem to be worthy of consideration.

The bill which your committee has had under consideration is based upon the definitions of practice followed in this and other states. Its more important features are the organizing of an examining board, and so far as its enforcement is considered, requires a new registration each year. It is the latter feature that will least commend it to many practitioners. We feel that this is the most essential feature of the proposed bill. After all the profession has said regarding medical legislation, it would seem that they could hardly object to this slight sacrifice without which we feel that the new bill would be scarcely more effective than the old law. A defective statute in our judgment is worse than none. Our present law when first enacted served a good purpose and placed Illinois in the front rank in this class of legislation. Since then precedents

have been made and certain chartered institutions have been organized which admit students with little or no preliminary requirement and whose equipment and curriculum are so defective that they can hardly rank as scientific schools. Undoubtedly the *raison d'etre* of these schools is found in the fact that their diploma is equivalent to a license to practice. The attempts at enforcement of the present act have forced many incompetents, and we are sorry to say, many who are venal to become registered. This is the defect we have sought earnestly to remedy in the proposed law. We feel that the power for harm of a quack or charlatan is greatly enhanced by his recognition as a qualified practitioner.

The effect of the proposed annual registration will be to eliminate the quacks and criminals. There is nothing in the present law that will prevent a man continuing in the practice of medicine, he being on the register, after repeated convictions for felony. All this can be easily prevented by a simple annual re-registration.

Finally we invite support to the proposed bill, even though every clause fails to meet with individual approval. The bill is the joint product of a number of committees, it has been scrutinized by able constitutional lawyers, and we think it is as good a bill as could be framed. If it receives the united support of the profession we may hope to place it in our statute book; if we are divided or lukewarm in its support we are foredoomed to failure.

Discussion on Symposium of Papers on Medical Legislation.

DR. J. M. G. CARTER, Waukegan: I was very much interested in the topic presented this morning, and have been flattering myself on the magnificent work that has been accomplished by this Section, as well as on the admirable papers that have been presented. The active

members on the Committee on Medical Legislation, of which Dr. Pettit is chairman, deserve great credit for the work they have done, and I assure you the work embodied in the bill they have drafted has required much thought and many hours of anxious study and care. They have not consulted physicians alone, but they have consulted members of the legal profession. The law presented by the chairman of the Committee on Legislation this morning and favored in the papers presented is, I believe, as near a correct law as can be presented. If I understand the matter rightly, it is a law which the judges will approve, or at least not interfere with in case it is adopted by the Legislature.

I hope the profession will take an active part in the furtherance of this law, and not find quibbling objections to some points that may not be in harmony with their own views. The Committee has found out what will pass muster in this matter. It has found out what the legal fraternity feel is a correct law. I hope this Society will encourage the Committee by heartily endorsing it.

Dr. Frances Dickinson, Chicago: This question has interested me very much. The remarks of our Treasurer are very true.

There is a phase of this subject that has not been brought out and which has a bearing on the question. We have had for many years a medical practice act, giving us minimum requirements, and to-day we have rulings by our State Board of Health which have no legislative backing, requiring much higher grades for schools to be in good standing. Why are these higher grade rulings recognized by the colleges?

That the State Board has no legal backing for its higher grade requirements is shown by the fact that there exists in Chicago to-day a chartered medical institution which appears to sell diplomas for cash, without any attendance whatever. All the other colleges require four years' attendance and graded studies, and yet there is no legislative act to uphold this high standard. This is the fourth year I have had occasion to watch these conditions. The State Board, about three years ago, sent word to all of the colleges that their entrance requirements must be higher ; that all of the entrance examinations must be made or conducted by some member of a university outside of the faculty of the college. What was the result? The State Board was in a veritable hornets' nest. Apparently all of the colleges objected, and then for the first time that I have any knowledge of the State Board asked to meet the representatives of every college in Chicago. At that meeting the representatives of every school were present. The so-called "sun-down" college just mentioned by Dr. Moyer was the only school in the entire city of Chicago that upheld the State Board in its higher

entrance requirements. The result was that the State Board backed out and the entrance requirement was rescinded.

A year ago it was ruled again by the State Board and the colleges have adopted it. On demand of the Board a list of all the freshmen students in each school and every new student who was in each school with advanced standing was forwarded to Springfield January first of this year, so there is now in the records of the State Board the name of every student who has entered to study medicine in every college in Chicago on the four year basis.

Competition between schools in the city of Chicago has played its part in raising the standard. Pride of State has stimulated State Boards to higher requirements. The source of supply of students for colleges, the community at large, does not realize or know that the rulings of the State Board have not always legal backing; therefore the public statement of a resolution by the State Board to the effect that colleges are not in good standing unless its ruling is adopted, is a whip rarely opposed and so seldom used unreasonably that even the largest school cannot afford to oppose nor a combination of schools oppose long.

I believe in legislative enactment covering the points upon which we all agree, one of which is a four years' course on the part of colleges. Why not list the studies to be taught, as all agree that the foundation work should be the same? The question of taxing each physician of the State fifty cents a year will be a mooted point and the probabilities are it will defeat the bill this year as last. There are other and better methods of making the proposed Medical Examining Board self-supporting.

Dr. A. C. Corr, Carlinville: I have been very much interested in the papers and discussions on this law, and I have been for a number of years. I recall to mind that in 1876 Dr. S. H. Birney, of Urbana, arose in this Society and asked that a committee be appointed to memorialize the Legislature with reference to the passage of a law creating a State Board of Health. The results of the work of that committee were consummated within a year, and a law was passed. It was quick and very efficient work. It was the first law of the kind at that time; many imperfections in it have developed since then. We have had occasion to circulate petitions in my own vicinity to petition the Legislature not to repeal it. It has been a scaffolding not only for the profession but for the people, leading them to a better appreciation of what laws ought to be and what laws can possibly be enacted and maintained. Hence the first thing required is a good law. We have had a substitute offered for the one we now have, and let us adhere to

it. Do not let everyone find fault with it if it does not meet with his particular views. Our Committee on Medical Legislation have been at work for a long time; they have become acquainted with the possibilities, probabilities and impossibilities of legislation, and I am sure they have done the best thing that can be done under the circumstances. I would advise that we all give them our undivided support. Let us say Amen to everything they have done. The fee of fifty cents we can bear. It will be a great benefit in the passage of the law, and yet it is a point that cannot be explained by the Committee to every member of the profession in the State. It can be done by us as individuals. It becomes us to seek out those who may have objections to certain features of the law, especially the one pertaining to the fee, and explain it to them. This is the means by which a revenue is to be created with which to pay the expenses incidental to the execution of the law. Those of you who have had anything to do with legislation know that we cannot get bills passed or laws enacted without money. When we went before the Legislative Committee two years ago we were asked how much money we had to spend, and we found it was necessary to have a friend in the Legislature, to be there at all times when the law comes up for reading or discussion. It is necessary to have somebody in the Committees who are willing to take this work in hand. I refer to the committee in the legislature to which the bill will be referred when presented. The Hamilton-Granger correspondence referred to in my presidential address last year is sufficient to indicate the necessity for such a plan.

Dr. John H. Hollister, Chicago: Just a word or two, Mr. President. I think it is well recognized throughout the United States that Illinois has taken a prominent and commendable position in her early history in matters of medical legislation, and that she has been in advance of most states in that she has been successful in the establishment of such an efficient State Board of Health. We have reached a point for further development through legislation. We stand, as it were, in a pivotal position, and there is required a very general and efficient effort on the part of the medical profession of the State for a still further advance. As has been suggested, we are not making this effort simply in the interest of the medical profession, for primarily it concerns most intimately every family in the State. This point must be emphasized and command the minds of our legislators at Springfield, and it must be so expressed that they shall be prepared to meet the requirement and secure the passage of the law. The people also should be educated as to its own interest in the matter, and, seeking its own interest, should make the demand. Here we shall meet with a

serious hindrance; we shall not have on part of the press that efficient co-operation and support which we might desire in the advocacy of a law of such general interest. I do not make any criticism, but you cannot fail to note the immense amount of money expended for advertisements every year and which brings such support to most of our papers. The advocacy of a law which will suppress that feature in the community will be met with moneyed opposition.

Again, if the law is enacted, I fear there will be failure on part of many of our physicians throughout the State to make yearly report and send their contribution of fifty cents. If the profession in Illinois at this day are so interested in securing protection for the people and laboring for a higher standard of medical practice, it seems to me that they should all be united in this matter. I have no doubt but what we shall finally succeed. I will venture to say that unless special effort has been made, such as has never been made before, there will be neglect, and the law if enacted may still become a dead letter. It occured to me since hearing the report of the Committee on Medical Organizations that a way to ultimate success may be found through our county organizations and their committees specially appointed for that purpose. Thus in every county where there is a medical organization the matter of making application for renewals of licenses to practice could have an efficient oversight which should reach very nearly the entire medical profession. I have this much further to say: That there is in my opinion no method by which we can so interest and enlist the entire medical profession so well as through county organizations, whose special committees can remind every practitioner yearly of his right and duty to register himself as a reputable physician and pay his sum of fifty cents, which is merely an incidental. We are at that point where, if the medical profession of Illinois is willing to do what it can do, it shall, as in the past, still stand in the front rank of the United States not only but of the world in the perfection of its organization and the efficiency of its legislation.

Dr. E. M. Sutton, Peoria: In conversation with one of the most successful editors in the country, an enterprising man and also a politician, I referred to this matter of the relation between the medical profession and the advertisements which appear in the lay press, and he informed me that not all editors were willing to take these advertisements and fight the medical profession. He also stated that if the State Medical Society would appoint a committee to meet with the State Editors' Association, which meets every year at Springfield, there would be no doubt about us being able to come to some agreement whereby we could obtain the influence of the newspapers to help

us in our legislation, and also an agreement whereby they would refrain from printing quack advertisements. I offer this as a suggestion for the Society.

DR. HUGH T. PATRICK, Chicago: I would like to say a few words on this subject. I appeal to the members of the Society not to act as obstructionists and quibble about details in this bill. We picked out the best men of the Society to serve on this committee. Dr. Pettit was selected as chairman because nobody else could be found as good, and then to the committee there were added several more of the best men in this Society, among them Dr. Moyer; and these men, after due deliberation and careful preparation, considering every point possible, have reported this bill as the best possible product of their labors, Now, it seems to me there is only one thing for the rest of us to do, and that is to give the bill prompt, emphatic and unqualified endorsement right now.

DR. J. W. PETTIT, Ottawa: I wish to correct a false impression which seems to be current in regard to the bill presented last session of the Legislature. Those having charge of the bill realized that sufficient time had not been taken to consider the wishes of the profession. The bill was presented prematurely. We knew it at the time, but presented it for the purpose of having it discussed, in which we succeeded. We felt that it would be useless to push the bill and were in doubt ourselves as to whether it was just what we wanted. Therefore it was permitted to lie in committee and die a still birth.

Your committee are endeavoring to determine the wishes of the profession and will not present any bill to the Legislature that is not endorsed by a large majority. There will be no snap judgment taken.

DR. H. M. BASCOM, Ottawa: The legislative committee of the Illinois Homœopathic Medical Association, unanimously endorse the bill presented by your committee; the bill is practically the outcome of the wishes of the majority of the several schools, as recognized by the present State Board of Health. When actually completed it will be "The will of the majority of the best element of the whole medical profession of the State of Illinois." Some of us expect other states will adopt the same standard and there will be a "reciprocity in medical licensure."

Any bill prepared only for the benefit of the profession, will fail. It must be for the benefit of the people, the patrons, rather than the profession, to receive proper legislative consideration.

THE LEGISLATION NECESSARY TO PROMOTE BETTER SANITATION THROUGHOUT THE STATE.

BY J. A. EGAN, M. D., SPRINGFIELD.

Mr. President and Members of the Illinois State Medical Society:

Between what we might do in theory and what we can do in practice, there is indeed a difference; so in the endeavor to determine just what laws are needed at the present time to ensure better sanitary conditions throughout our State, it will be well to consider only those we can entertain a reasonable hope of securing, which, in the light of past experiences, will be exceedingly few. Too little heed, unfortunately, is given by our law-makers to Disraeli's valued aphorism, "the health of the public ought to be one of the chief considerations of the statesman," but it is questionable whether the fault lies entirely with the legislative bodies. The people in general do not appear to realize the importance of preventive measures in disease, and to many the money spent in public improvements or in the gathering and dissemination of knowledge relative to the preventable causes of disease or death, is money thrown away. The realization of their error often unfortunately comes too late. As the lamented Rauch once very aptly said: "If you want any legislation in regard to sanitary measures, you can get it at the tail end or not at all, unless some terrible calamity has befallen the people."

If it were left to this meeting to decide just what sanitary legislation is most needed at the present time, the views expressed, while all of a high degree of excellence, would nec-

essarily show many points of difference. There could be no unanimity of opinion until the measures proposed were thoroughly discussed, and their merits and demerits, advantages and disadvantages, clearly elucidated. The member of the State Board of Health, the local health officer, the country physician and the city practitioner would each naturally decide in favor of that which seemed to him to be of the greatest benefit, and which at the same time appeared entirely practicable, the conclusions arrived at being in some instances those acquired after an extended experience in sanitation; in other cases those the results of careful thought and study, and no doubt a not inconsiderable proportion would represent hastily formed opinions in which little thought would be given to the importance of the subject at issue.

Locality, also, would be a factor of importance. What to the physician on the banks of the Ohio would appear an urgent necessity, might to his confrere near the Wisconsin line seem an absurdity, or at least not to be compared with the measures he deems advisable, unless the subject was accorded unusual attention and the geographical position of the State and the local conditions prevailing taken into consideration, and then even, the individual environment would tend to influence. Apropos of this, it is indeed unfortunate that in certain portions of Illinois there appears to be little conception of the fact that we are all citizens of a section of the Union which extends from the latitude of Boston on the north to that of Richmond on the south. It is, furthermore, to be regretted that this lack of realization, which is occasioned by indifference, a lapse of memory or a want of knowledge, is due also in a measure to the teachings of a portion of the public press, which latter is said to be an educator of the people. One unacquainted with the geography of his country, or forgetful of the knowledge acquired in that branch of study,

might, after reading certain newspapers in the State for a lengthened period, come to the conclusion that the commonwealth lay north of the 40th parallel of latitude. To him, therefore, could come no conception of the conditions, resources and necessities of that territory lying between the Mississippi and Ohio rivers, waters which have been happily called "the two great highways of the continent." He could, consequently, have but little idea of the dangers that threaten the inhabitants of this division of the State, and even if such were clearly pointed out, the effect would be *nil*, for has not his mentor decreed that these things can not be?

Early in September, 1897, one of the leading daily newspapers in Illinois, in an editorial utterance, gravely assured its readers that yellow fever could not spread in Illinois in September. Ten days later, fearing possibly that some skepticism might exist, even among those who were wont to swallow almost any declaration without a grimace, this same newspaper, this oracle in health and hygiene, again, editorially, made the following remarkable statement:

"It is impossible that yellow fever, even if imported in its acute form, could spread at this time of the year."

To the physician of southern Illinois, in whose memory the epidemic of 1878 rises with cruel distinctness, it is not necessary to demonstrate the untruthfulness and absurdity of this remark; neither is there occasion for offering any assurance to the older physicians of other portions of the State. The practitioner who has graduated in recent years, or he who has taken up his residence in the State during the past decade, may not, however, know that in September and October, 1878, when the temperature prevailing was far less favorable for the spread of yellow fever than that existing during the same months in 1897, this dreaded plague raged with virulence in Cairo, Illinois, the greatest intensity being between September

25th and October 20th, and that after the former date no record of cases was kept on account of the rapid spread of the disease.

This fever which "cannot spread in Illinois in September," spread in Illinois in October, a few days after frost had cast its mantle over a portion of the State. Cases occurred also after the U. S. Weather Bureau reported a general frost in Illinois, and ten days prior to the date on which the mercury fell in several parts of the State to 32° F. the disease was at its height.

In derision it has been said, "yellow fever and frost were simultaneously reported this morning in Illinois." In Cairo several headstones and unmarked graves bear mute testimony that such things can be.

To illustrate the various views entertained by members of the profession in relation to the measures best calculated to remedy existing defects in our sanitary laws, and the difficulty which necessarily must attend an attempt of any one individual to formulate a bill which will meet with the approbation of those interested in hygiene and preventive medicine, I deem it advisable to embody in this paper the report of the Committee on Legislation of the Auxiliary Sanitary Association of the State Board, which was rendered at the second meeting of that organization in November, 1894. The gentlemen composing the committee, four physicians and one layman, labored earnestly, and the President, a member of the State Board of Health, enlisted the aid of others who were familiar with the subject at issue. It was recommended that a bill be drafted in which should be inserted clauses covering each of the following heads:

First—Creation of a board of health and such health officers and sanitary inspectors as the size and demands of the locality may require.

Second—Making provisions for the care of persons confined in quarantine.

Third—Abatement of nuisances and all offensive and dangerous accumulations.

Fourth—Granting to health authorities the power to enforce isolation and quarantine, in cases of contagious and infectious diseases.

Fifth—Requiring prompt notice to the local board of health of every case of disease required to be reported to the State Board, and prescribing penalty for failure to make such report.

Sixth—Prescribing regulations for the removal and conveyance of corpses.

Seventh—Providing for the keeping of accurate record of all work done by the local boards of health.

Eighth—Granting the same power to and enjoining the same duties upon township boards of health, as are imposed upon or granted to boards in cities and towns.

Ninth—Defining public nuisances and providing for the abatement of the same.

Tenth—Prescribing a penalty for failure or neglect of a local board to properly perform its duties and authorizing the State Board to make and enforce orders in local matters, when emergency exists and the local board has neglected or refused to act.

Eleventh—Providing for establishment of quarantine, securing grounds, etc., and giving to board of health exclusive control of same.

Twelfth—Granting to local boards the right to establish quarantine under supervision and control of the State Board.

Thirteenth—Providing for the inspection of the sanitary condition of schools and school houses, penal institutions and almshouses, the closing of schools and prohibiting of public gatherings.

Fourteenth—Forbidding the interment of any corpse in any portion of the State except on burial permits issued by the clerk of the local board of health, based upon a certificate of death, signed by the attending physician (or the coroner), which permit shall only be granted upon the actual presentation of such certificate.

Fifteenth—Providing for the making of an annual sanitary report by all boards of health to the council of the corporation and to the State Board of Health.

Sixteenth—Requiring all children to be vaccinated as a condition of entrance into or attendance upon public, private or parochial schools.

Seventeenth—Providing for gratuitous vaccination and disinfectants, enforcement of disinfection, relief of sick poor, and the erection of a temporary hospital.

Eighteenth—Providing for the disinfection, renovation or destruction of articles and the replacement of the same.

Nineteenth—Providing for the enforcement of rules and regulations adopted by the Board and providing penalty for refusing or neglecting such enforcement.

Twentieth—Providing for the establishment and maintenance of a State vaccine farm in connection with State University at Champaign.

Twenty-first—Fixing penalty for violation of provisions of the statute or any order or regulation of the Board of Health made in pursuance thereof, or interfering with or wilfully or illegally omitting to obey such an order.

Twenty-second—Defining the method of procedure in cases arising under the act.

Twenty-third—Providing for prosecution and proceedings by State Board, and fixing the disposition to be made of fines and judgments into the treasury for the use of the Board.

While the proposed act contained many good features, it is

extremely doubtful that a "blanket" bill of this character could ever pass beyond the introductory stage in the legislature. In addition, many of the provisions are unnecessary, being provided for in the statutes. It is also the prerogative of local boards of health to enforce, if not directly, through the medium of councils or boards of trustees, the provisions contained in at least seven of the sections enumerated, and the State Board of Health, under the powers assigned it by the legislature in the act creating the Board, has full authority to carry out the requirements of the sections referring to the conveyance of corpses, the enforcement of orders in local matters, and the inspection of schools and public buildings. Too much praise, however, cannot be accorded to the effort to create local boards of health and health officers, making the appointment mandatory, not optional, as at present.

From a sociological as well as a sanitary standpoint, the enactment of a law forbidding the interment of corpses in any portion of the State, except on a properly issued burial permit, is imperative, hence the section embracing this provision is, with the exception, possibly, of that tending to establish local boards of health, of greater importance than any other named. While it is within the province of local authorities to enforce this requirement, for obvious reasons a statutory law is to be preferred. In order, however, that the statistics thus necessarily obtained by municipalities might be of value to the State, a clause should have been added requiring a prompt report of all deaths to be made weekly, at least, to the State Board of Health.

Vital statistics, it has been often said, opened the door to preventive medicine; yet no reference to the registration of births and deaths was made by the committee in its report, and although the subject was discussed at length during the meeting and a forcible plea for proper legislation was made

by Dr. A. R. Reynolds, Commissioner of Health, Chicago, who pointed out the necessity for a system in cities like Chicago, where many defects and inadequacies of existing health laws are more obvious than in smaller communities, it seemingly was not deemed advisable to add an additional section to the proposed bill. This apparent neglect was perhaps due to the fact that the present law which provides for a registration of vital and mortuary statistics, though manifestly complete in every particular, has been inoperative for several years, hence the wisdom of enacting another might be open to question.

That the present law is not enforced is due, not to the laches of the State Board of Health, but to a defect in the law itself. The act prescribes that the "county clerks shall be required to render a full and complete report of all births and deaths to the Board of Health annually, or at such times as the Board may require," but it is impracticable for this official to see that the provision requiring a report to him is carried into effect, even though empowered to bring suits for non-compliance. The registration of births, furthermore, is a question of demography rather than one of medicine or sanitation, and it is unjust and unwise to compel physicians to furnish information exclusively of forensic purport without any remuneration whatever. In all probability, however, had not the State Board of Health, in its anxiety to secure the "correlative facts," which the physician under penalty is required to furnish, attempted to make a census-taker of the overworked practitioner, who already does too much for nothing, the law would not have become so completely a "dead letter." All those present are doubtless familiar with the State blank. It contains nineteen different entries, the majority of which are intended to ensure the identification of the child. In this matter the physician is interested alike with every citizen, and no more.

Per contra, the Chicago Department of Health has in operation a plan which it is said "promises to produce better results than any devised in this country." Postal cards, addressed to the Department, on the reverse side of which appear four entries, embracing the name of the mother and sex of the child, date and place of birth, are furnished gratis to all physicians and midwives in the city. This plan, which can be put into effect by any municipality, meets with the approval of physicians and is a success, and it is not doubted that before the end of this year the majority, if not all, of the Chicago physicians will report promptly.

Whatever legislation we may seek, whether it be designed to elicit information on drainage, sewerage, water supplies and foods; to regulate systems of sewerage and public water supplies; to regulate occupations and practices dangerous or detrimental to the public health; to prevent the introduction of disease through external commerce; to secure the appointment of a local board of health in every town, village and city, and ensure the prompt report of all contagious and infectious diseases to the State Board of Health; to prevent the pollution of rivers and water supplies, or to provide better safeguards against charlatans; and paradoxical as it may seem, the enforcement of the latter clause would materially promote better sanitation in Illinois, it can be secured only through the concerted efforts of the physicians of the State, who, regardless of their individual opinions and the apparent necessity of the particular divisions of the State in which they reside, will work amicably and vigorously to secure the enactment of a bill endorsed by a representative body of physicians in the State.

In unity of this character there is not only strength, but absolute power, for whatever measure is agreed upon by the physicians of this State, that measure can become a law if

those by whom it is approved labor earnestly to secure its passage. If, however, as is frequently the case, but a few toil while many think, all efforts made will probably be nugatory. That physicians can favor a bill which materially affects them, and yet, apparently, be indifferent whether it pass or fail, was very strongly impressed upon me, last June, in the House of Representatives, while I was endeavoring to convince one of the legislators that the so-called Osteopathic Bill, while seemingly of the most harmless and innocent character, was, in fact, a most pernicious measure, permitting any unscrupulous or ignorant person to practice medicine in the State. Interrupting me in the midst of an argument, which I hoped was particularly convincing, this gentleman, who afterwards recorded his vote in favor of the registration, without examination, of the disciples of Still, the card of one of whom certifying that he cures all diseases, naming among others labor! and inflammation of the *prostrate* gland, I have in my possession, very quietly drawled: "It does not appear to me, Doctor, that the physicians of the State are of your opinion. If so the fact has not been communicated to me. I have over one hundred letters from my constituents asking me to vote for that bill. Not one protest against its passage has been made to me. I shall vote for the measure."

It is earnestly hoped that at the next meeting of the Auxiliary Sanitary Association of the State Board of Health, which for obvious reasons will be held in September instead of November next, there will be a representation from each county in the State, and that the subject of needed legislation will not only be earnestly and intelligently discussed, but that a bill will be drafted to which the majority of delegates present will give cordial assent.

Whatever may be the results of the deliberations of the Association, there are in my opinion two measures of the

most vital importance, the enactment of which seems absolutely necessary before any legislation calculated to promote better sanitation can be carried into effect, viz.: One establishing a State Board of Medical Examiners, prescribing its power and duties, providing for the licensing of practitioners of medicine and surgery, and regulating the practice of medicine and midwifery in the State; and a second, establishing a Board of Health in every village, town and city in the State, and requiring prompt report of all deaths and of certain infectious and contagious diseases to the State Board of Health.

The sanitary duties of the State to the public consist in part in protecting the purity of the soil, air, water and food, in investigating the causes of disease and guarding against its spread and against its propagation, when possible, hence the enforcement of any sanitary legislation would, in all probability, be delegated to the State Board of Health, but it is questionable whether the legislation would be productive of any great benefit, unless the acts necessitated little or no additional duties on the part of the Secretary or members of the Board. The Board, hampered as it is at present, by the enforcement of the Medical Practice Act, the duties in connection with which are becoming more onerous and of greater magnitude every year, cannot perform the work in sanitation which now devolves upon it. The Board should be freed from this entanglement; it should not be shackled by the performance of duties belonging to other departments. In the majority of the States of the Union the State Board of Health has nothing to do with the licensing of physicians or the regulations of medical colleges, and it is well known that the Boards which are not thus freed, are doing the least in sanitary investigation.

While the scope of the Board can be materially widened, and further authority be given it, as in Massachusetts, New York and Ohio, to protect the purity of the water supplies of

the State and enforce suitable disposal of sewage and other wastes, it is doubtful whether the additional powers thought necessary by many, are absolutely essential. The law of the State, defining the power of the Board, states that it "shall have authority to make such rules and regulations and such sanitary investigations as they may from time to time deem necessary for the preservation or improvement of the public health," and, under this section, says the Attorney General, "broad duties devolve upon the State Board of Health, and ample power is given to enable them to discharge their duties. They not only have the right, but it is their duty to make any or all rules and regulations which they deem necessary to preserve the public health. Such rules and regulations when promulgated have the force and authority of law, and are to be enforced if necessary by the entire power of the State."

Contrary to general belief, the statutes do not establish local boards of health in villages and cities. The creation of such is optional; city councils and village trustees being authorized to appoint. As in the adjoining states, the appointment should be mandatory and the charters of the local boards perpetual. Owing to this defect in the law, several cities in the State have no board of health or medical health officers, and on the appearance of a few cases of infectious or contagious diseases, an appeal to the State Board "to take charge of matters" is frequently made by the city marshal or "sanitary policeman" to whom is assigned the task of creating a hygienic Utopia in the municipality. It is useless, therefore, for the State Board of Health to expect to receive material assistance in the enforcement of sanitary rules and in observance of precautions necessary to prevent the spread of disease, in localities where the qualifications demanded of the health officer consist in an ability to observe accumulations of garbage, and to detect noxious odors. It seems difficult

to impress upon some communities the fact that a health officer is not a scavenger.

Certain duties can well be imposed on local boards of health; in fact, no legislation in connection with these organizations will be operative unless such be done, but it does not appear that the "specific powers" so frequently referred to need be the subject of special legislation, for, as intimated above, the statutes now confer upon local boards all authority required. This view is apparently entertained by the Supreme Court of the State, as in the case of Mason et al. vs. the City of Shawneetown (77 Ill., 533) this body decided as follows:

"When an incorporated town or city has been invested with power to pass an ordinance, by the legislature, for the government or the welfare of the municipality, an ordinance enacted by the legislative branch of the corporation has the same force and effect of a law passed by the legislature, and cannot be regarded otherwise than as a law of and within the corporation. An ordinance is the law of the inhabitants of the municipality."

This is a clear and concise statement of the principle of the law governing the case, and effectually settles the question under discussion.

Let us, consequently, before seeking the enactment of further laws, strive earnestly to have established a State Board of Medical Examiners to license physicians and midwives, and to regulate medical colleges, and to have created in every village, town and city in the State a local board of health, of which at least one physician should be a member. When this is accomplished, two important steps in the legislation necessary to promote better sanitation throughout the State will have been taken.

URÆMIA IN THE PROCESS OF CHILD-BEARING.

BY HENRY F. LEWIS, A. B., M. D., CHICAGO.

The term uræmia I take to mean the condition of the system resulting from the retention in the blood of toxic products which should normally be eliminated chiefly in the urine. Eclampsia is a frequent sequel of uræmic phenomena occurring in the course of the child-bearing process. In our subject are included the eclampsias, neuroses, psychoses and other symptoms due to the toxæmia accompanying or following pregnancy. The convulsions themselves are the more or less accidental accompaniments of the vicious blood state. The urinary disturbance may be due to two different general causes : a pre-existing renal lesion or an acute abnormal state of the excretory apparatus arising *de novo* during pregnancy. The latter is probably the more common. Our subject includes the albuminuria of pregnancy, which is found in a considerable proportion of all cases; the cases exhibiting the more serious symptoms of uræmia without eclampsia; the cases where the toxæmia causes convulsions, as well as the cases, few in number, where eclampsia comes on without albuminuria or other sign of urinary disturbance. The reality of the last class of cases is to me somewhat doubtful. Inglerslev collected, however, 108 cases where there was eclampsia but no albuminuria nor pathological changes in the kidneys. (64). I believe that symptoms of kidney lesions are often reported absent on insufficient data. Albumen may exist in one specimen of a day's urine and be absent in another taken

a few hours later; albumen may be absent in the morning and present in the afternoon, or *vice versa*. The absence of albumen can only be proven when a report is made on an average specimen from the whole amount passed in twenty-four hours, or when the urine is examined on different days. Again, the absence of albumen is not a certain proof of the absence of kidney disease. It rarely happens, however, that the urine is perfectly normal in all respects,—chemically, physically and microscopically—when there exists any lesion of the kidney, demonstrable at the autopsy. Many authentic cases are recorded where the urine was found free from albumen and casts a few hours before an attack of eclampsia, but almost invariably both were found afterwards. This fact has led some authors to assert that the albuminuria and casts were the result instead of the cause of the eclampsia. That this last is not the case seems probable since kidney disturbance seldom or never follows the convulsions of epilepsy, hysteria or strychnine poisoning, however violent the seizures may be.

The first tendencies towards making a casual relation between kidney disease and eclampsia were begun even before Bright had written his articles on nephritis. The first records were in 1797 by Demanet, (3), who observed a connection between dropsy and eclampsia. Then Hamilton (4) observed that women who had great œdema in the last months of pregnancy were liable to eclampsia. In 1843 Lever (5) and Simpson (6) noted the etiological relation of albuminuria to eclampsia. Frerichs (54) in 1851 first collected data on the connection between puerperal eclampsia and nephritis. He concluded that the convulsions were the result of uræmia intoxication and that carbonate of ammonium was the toxic material.

Albuminuria occurs in about five per cent. of pregnant women. (2). In the large majority of cases there is no im-

portant kidney lesion and the albumen is due to a disturbed blood pressure or to hyper-albuminosis of the blood. Of the last thousand cases entering the Boston Lying-in Hospital before 1890 albumen was absent in 807 and present in 393 (40 per cent.). There were convulsions in 27 of the albuminuric cases (7 per cent.). A. Worcester (8) in 700 cases of midwifery had eleven cases of eclampsia. T. E. Cunningham (9) in 2000 obstetrical cases found eclampsia only three times. In the discussion of the above paper Dr. Driver said that six cases had occurred to him in his first 1000 cases of labor. Varnier states (11) that of 800 pregnancies in women of good health in which the urine was examined every fifteen days during the last three months, only three had albuminuria and these were primiparæ. Löhlein (12) analyzes 52,328 labors occurring in German clinics during two years and finds 325 cases of eclampsia—1–161. Palmer (13) concludes from study of statistics of the Cincinnati Hospital that albuminuria exists in 50 per cent. of all pregnancies at some period. No other observer has found such a large number even when the period of parturition is included, where, as is well known, the great muscular exertion causes a slight temporary appearance of albumen. But even here the average is 24 per cent. (2). In the Dresden Frauenklinik from September 1, 1883, when Leopold took charge, to June, 1891, (7¾ years), there occurred 10,718 births. Among these there were 81 cases of eclampsia (.75 per cent.) (1–133). 70 (86.42 per cent.) were primiparæ and 11 (13.58 per cent.) were multiparæ. Of the whole number of births 5363 were primiparæ and 5342 were multiparæ and 13 are not stated. Therefore eclampsia took place in 1 32 per cent. of the primiparæ and in .21 per cent of the multiparæ (14). Schroeder & Scanzoni estimate that eclampsia is found about once in each five hundred cases of labor.

FREQUENCY OF ALBUMINURIA IN PREGNANCY.

AUTHORITY	NO. CASES	NO. ALB.	PER CENT.
Richardson (7)	1,000	393	40
"	156	66	41
H. Fehling (15) (Basel)	1,241	73	5.9
" (Stuttgart)	767	18	2.3
Mayer (16)	106	5	4.7
Blot (16)	205	40	19.5
Litzmann (16)	79	16	20
Winckel (16)	104	10	9.6
Ingersley (16)	600	29	4.8
L. Mayer (17)	1,124	60	5.4
Lantos (14)	70	13	18.5
Varnier (11)	800	3	.4
	6,252	726	11.5

Fehling says that albuminuria occurs in 6 per cent. of all pregnant women evenly divided between primiparæ and multiparæ, and in labor 30 per cent. show albuminuria. (21.)

FREQUENCY OF ALBUMINURIA IN PARTURITION.

AUTHORITY	NO. CASES	NO. ALB.	PER CENT.
Mayer, (18)	100	40	40
Litzmann, (18)	100	37	37
Flaischlen, (18)	537	93	17.3
Moericke, (18)	100	37	37
Winckel, (18)	370	72	19.4
Ingerslev. (18)	153	49	32
L. Mayer, (17)	1,138	284	25
Lantos, (14)	600	356	59.33
	3,098	968	31

FREQUENCY OF ECLAMPSIA.

AUTHORITY	NO. CASES	NO. OF EC.	PER CENT.
Winckel, (14)	6,323	23	.36
Lantos, (14)	14,815	53	.36
Loehlein, (12)	52,328	325	.62
Leopold, (14)	10,718	80	.75
Priv. prac. Marie Zakzynska, (10)	187	3	1.8
Priv. prac. T. E. Cunningham, (9)	2,000	3	.15
Priv. prac. A. Worcester, (8)	700	11	1.5
Priv. prac. Driver, (9)	1,000	6	.6
Richardson, (7)	1,156	33	2.8
W. A. Dunne, (19)	1,168 (priv.)	3	.25
Paupertoff, (20). (Moscow Obstet. Ins.	46,539	288	.61
Total	136,934	878	.6
Private practice	5,055	76	.5
Hospitals	131,879	802	.61

Contrary to preconceived opinion, it will be seen from my figures that there is little difference in the percentage of eclamptics in hospital and private practice. Yet there is every reason why hospitals should have a larger proportion of such cases.

Primiparæ are three times as liable to eclampsia as multiparæ. In hospitals everywhere there is always a great preponderance of primiparæ, therefore from that factor alone their statistics should show a larger number than should private practice. As in the case of most diseases, so in parturition, the severer cases will go to the hospitals, and for this reason we would naturally expect to find more cases of eclampsia there. It is said to occur more often among those suffering from nervous excitement, shame or remorse, in twin births, in hydramnios and in deformed pelvis; all classes of cases that are more liable to go to a hospital.

The general frequency may be got at by reference to mortuary statistics. Knowing the birth-rate for a given time and the death-rate from puerperal eclampsia, we can estimate the frequency of the latter with a degree of accuracy dependent upon the accuracy of the death certificates. In this country we all know there is much to be desired in the carefulness with which physicians prepare death certificates. According to Hegar, of 34,553 labors in Baden (1864–6) 0.05 per cent. died of eclampsia, and according to Ehler, of 141,702 labors in Berlin (1885–7) 70 or 0.49 per cent. died of eclampsia. Thus, if the mortality of eclampsia be 1 in 5 we have a frequency of eclampsia of 1–400, and if the mortality be 1 in 3 we have a frequency of 1–675.

Why, in the normal process of child-bearing, should we find so often the manifestations of a disturbance of the excretory functions and what are the causes of the phenomena which we call uræmia. Most authorities are agreed that it is a

uræmia, using the term in the sense of an auto-infection from retention in the blood of matter which would normally be excreted, or an overproduction of toxins beyond the powers of elimination. What this poison is and what causes it to appear in the blood of the pregnant woman have been twin points of controversy since uræmia was recognized as a pathological entity. As to the first, it has been answered that the poison is urea; that it is carbonate of ammonium (1); that it is kreatin and kreatinin; that it is a ferment not normally present; that it is a product of the metabolism of the fœtus; and finally that it is an infective ptomaine. As to the second, it has been answered that the abdominal pressure causes a passive congestion of the kidneys; that the pressure on the renal arteries causes an anæmia of the kidneys; that the pressure on the ureters by the presenting part causes a urinary stasis; that the irritation of the uterus on the pelvic nerves causes a reflex spasm of the renal vessels and a consequent anæmic condition; that the hydræmia of pregnancy causes a diminished nutrition of the kidneys and therefore a failure of their excretory powers; that the same cause acts on the liver so as to interfere with the abstraction of urea and other waste products from the blood.

Puerperel toxæmia occurs more often in very young or in very elderly primiparæ. Goldberg states that eclampsia happens in 1.32 per cent. of primiparæ and in .21 per cent. of multiparæ (14). Other authors report as follows: Winckel (22) of 683 cases of eclampsia found that 77 per cent. primiparæ, Lantos (23) 78 per cent., Loehlein (23) .85 per cent., C. Braun (23) .86 per cent., Scanzoni (23) .79 per cent., Kopetsch (24) .75 per cent., Schaute (25) .82 per cent.

In Goldberg's collection of eighty-one cases of eclampsia the average age of 70 primiparæ was 22¾ years and of 11 multiparæ 34½ years. There were 17 under 20 years, 51

between 20 and 30, 12 between 30 and 40 and 1 over 40; the youngest was 15 and the oldest 45 years (14). Lantos in 53 cases observed 22 under 20 years, 19 under 25, 8 under 30, 3 under 35 and 1 under 38.

Albuminuria and eclampsia with other uræmic manifestations occur more often in twin pregnancies, in hydramnion and in other conditions where there is an abnormal distention of the uterus and abdomen. Among eclamptic cases there are nearly five times the usual number of twins. Thus distention obviously produces an increased counter-pressure on the kidneys and ureters. As we have seen, eclampsia occurs eight times out of ten in primiparæ, in whom the abdominal walls are much more tense than in multiparæ and therefore in whom there is much more likelihood of pressure on the other contents of the abdomen, especially the kidneys, ureters, liver and blood vessels. I think we cannot fully agree with Halbertsma in ascribing all the uræmic symptoms to the mechanical stasis of the urine from pressure of the presenting part (usually the vertex) on the ureters as they enter the true pelvis, but a considerable influence in the production of albuminuria and the kidney lesions must be accorded to the increased abdominal tension. The albumen appears in the vast majority of cases during the last three months of pregnancy, when the uterus is encroaching upon all the organs of the abdomen and even upon those of the thorax. This increase of counter-pressure must be felt most on the veins of the posterior part of the abdomen and the renal veins as well. That a general venous stasis exists is shown by the hypertrophy of the left ventricle, by the varicose veins of the vulva and legs, by the œdema of the ankles and by the digestive symptoms so often observed at this time. That the liver and kidneys participate in the general passive congestion there can be no doubt. All the pathological evidence as far as it goes

is in this direction. The changes seen in the kidneys and liver can usually be explained by passive hyperæmia. Those cases where albuminuria is observed in the early months of pregnancy can be explained by a catarrhal condition of the urinary passages (1) or by a pre-existing renal disorder. In this connection I may cite the researches of Meyer who found that ligature of the renal veins always produced albuminuria, and further, that ligature of the veins of one side produced albumen from the ureter of that side only. (26.) It does not disprove the uræmic theory, that in exceptional cases no albuminuria occurs before the first spasm but that it has supervened after the convulsion. Eclampsia may in these cases be due to a pre-albuminous stage of nephritis. (27.) The erect posture is perhaps responsible for the urinary disorders of pregnancy as it is for inguinal hernia, varicocele, misplacement of the uterus and many other ills of human flesh. In animals where the abdominal contents hang downwards from the spinal column there can be no pressure on the veins and surely none on the ureters. In such animals puerperal eclampsia is unknown. (28.)

The effect of reduction in size of the uterus on the uræmic symptoms is striking in proof of the pressure and stasis theory. When the waters break there is usually a remission in the intensity of the symptoms, which is even more noticeable after the complete emptying of the uterus.

The theory of Halbertsma (58), that eclampsia is caused by the pressure of the presenting part on the ureters and the consequent retention of the excretory products in the blood, is combatted by the fact that convulsions and other uræmic symptoms are often observed in presentations of the feet, breech, shoulder or other part than the vertex, as well as cases of twins and hydramnion. Indeed, it seems to occur with proportionate frequency in all presentations. Goldberg

observed, in his eighty-one cases of eclampsia, seventy-nine vertex presentations, one breech and one transverse. The vertex cases, however, do not bear out Halbertsma's idea, because less than half of them had the head fixed in the superior strait. It is evident that, unless the head engages firmly in the pelvis, it can exert no more pressure on the ureters than could the breech or other part. He had one case where there was complete anuria for eight hours, evidently due to the pressure of the firmly engaged head on the ureters. Yet there was no eclampsia nor other untoward symptom, and complete convalescence followed. On the other hand, the autopsy seldom finds dilatation of the ureter (59,) and closure of these ducts during operations or from tumors never produces typical uræmic eclampsia. (60.)

The influence of heredity has been traced by some writers. Three of Goldberg's cases came from a family subject to mental and nervous diseases, fourteen came of parents having lung disease, mostly tubercular, and the sister of one had died of eclampsia during labor. (14.) Elliott mentions a mother and four daughters who suffered from eclampsia puerperalis. (29.)

The uræmic origin of puerperal eclampsia is rejected by some authorities, notably Lusk (30), who thinks the theory of reflex irritation is most satisfactory. He is influenced by the fact that albuminuria is present so often without eclampsia and that sometimes eclampsia occurs without albuminuria. Lantos, of Buda-Pesth, from a study of fifty-three cases, believes albuminuria of pregnancy due to reflex irritation of the sympathetic and renal nerves. This irritation itself is due to irritation of the uterine nerve from enlargement of the organ. Eclampsia is a sort of acute peripheral epilepsy, having its origin in the uterus. (31.) Prutz, from a study of twenty-two kidneys, concludes that kidney disease is not the cause in most cases. (32.)

In the minds of many, arterial spasm and consequent brain anæmia account for the eclamptic symptoms. The cause of the vascular spasm on the other hand may be toxæmia or reflex irritation from the uterine and pelvic nerves. This accounts for the quick attack and the relatively quick *restitutio ad integrum* and the usual negative findings of the autopsy. The favorable action of therapy addressed to the vessel-spasm is thus explained.

It would be strange if one or more microbes had not been invoked as the cause of puerperal uræmia, and so indeed several observers have reported. Favre made cultures from the white infarcts of the placentæ and got micrococci, young cultures of which produced spasms in rabbits. (34.) Combemale and Cue of Lille conclude that staphylococci are a direct cause in cases following labor. They find that the soluble products of staphylococci are convulsive poisons and consider the symptoms a variety of sepsis. (35.) Blanc (35) in 1889 reported a short bacillus found in the urine of eclamptics whose culture produced in rabbits convulsions, dyspnœa and death. Gerdes examined the kidneys, lungs, aortic blood and liver of eclamptics and found certain short bacilli very poisonous to mice and rats, causing convulsions and coma. (37.) These observations have not been verified by many others. Indeed, several writers state that the bacillus seen by Gerdes and the others was only the proteus vulgaris. (38, 39.) Prutz (l. c.) examined for microbes each of his twenty-two kidney specimens, but with negative result. Chambrelent (40), reporting three cases, states that the blood serum is more toxic than usual, but inoculations of blood and urine in the various media rarely yielded microbes, and then of different varieties. He thought these came from the air of the room. Similar cultures were found in the blood of healthy puerperal women. With Tarnier he studied the relative tox-

icity of the blood in puerperal eclampsia and concluded that the toxicity is directly increased in proportion to the severity of the symptoms. (41.)

What the poison is which produces the symptoms we call uræmic cannot yet be definitely answered. The early writers thought it was urea (42), but then it was found that solutions of pure urea would not produce such symptoms except in amounts far in excess of any ever observed in nature. Herman (43) shows the close connection between the urea and the convulsions. A considerable diminution of urea causes severer spasms, and as the urea increases in the urine, the spasms cease, while when the spasms go on and the patient dies, the amount of urea does not increase. Carl Braun (1) considered the poison to be carbonate of ammonium transformed from the accumulated urea of the blood by the influence of some ferment of unknown character. On the other hand, except in a single case, neither urea nor carbonate of ammonium have ever been found in the blood of eclamptics, and experimentally a very large amount of either is required to produce convulsive symptoms. (2.) Oppler modifies this theory by saying that it is not the retained urinary products in the blood which are the cause, but the products of an abnormal chemical metabolism in the tissues which cause the irritation of the central organs (2.) Kreatin and kreatinin seem to play a considerable part in the intoxication. Landois experimented with these substances and with urate sediment and acid phosphate of potassium and found that all caused spasms by action on the motor centers of the brain. (44.) The first two substances at least are found in excess in the urine of eclamptics and those suffering from other forms of uræmia. Hoppe found five times the normal amount of kreatin in one eclamptic case. The retention of urea, kreatin and these other excrementitious matters in the blood must result from the ina-

bility of the kidney to eliminate them. It is probable, too, that the liver has much to do in this failure of elimination. The same cause which interferes with the secretory power of the kidney must also act on the liver, or, as Klebs and other observers think, the main factor may be the presence in the blood current of liver cells and the presence of liver cell thrombosis in the portal venules and the renal arteries. (45.) The pressure of the growing uterus is believed to squeeze the liver and thus cause this exfoliation of its epithelial cells. (44.) As to the origin of that lesion of the kidney which determines the retention of poisons, there has been recognized reflex spasm of the renal arterioles causing anæmia of the kidney, (the "pregnancy-kidney" of Leyden.) Or, again, mechanical pressure of the gravid uterus on the abdominal and renal veins may induce passive congestion in the kidney and consequent impairment of its epithelium. The reflex irritation from the uterus would produce arterial spasm and anæmia in other organs as well as the kidney, notably the brain. (46, 47, 48.) Indeed, the preponderance of the cerebral element in this reflex anæmia may account for those cases of uræmia and eclampsia without albumen or apparent renal disorder.

Several writers have observed a favorable influence upon the uræmic symptoms following the death of the child and have argued that the poisonous influence may come from the fœtus. (49.) It is certain that the symptoms usually improve as soon as the child dies (84), perhaps because thus a part of the manufacture of toxines ceases. Acetone passes from the fœtus to the mother during its life; the maternal urine contains acetone and the breath smells of it (50). It may lead to acute nephritis and to acute yellow atrophy of the liver. It is found in diabetic coma (51). Acetonæmia however probably follows like eclampsia from uræmia and is not itself a cause of the latter (44).

Like convulsions seen in childhood, probably a certain number of cases resembling those of puerperal uræmia may be caused by reflexes from other parts than the genitals, especially the intestinal tract. (55). These, while not strictly under our subject, yet are caused by an auto-intoxication from the soluble contents of the intestine and exhibit similar phenomena (52).

The liver as an emunctory organ may play a considerable part in the causation of so-called uræmic symptoms, and the more that organ is studied of late the more likely it is that its influence in the phenomena of auto-intoxication is important. Certain cases of puerperal eclampsia and allied conditions are probably due to an insufficiency of the liver rather than of the kidney. The lungs, intestines and skin are also emunctory organs of importance, the insufficiency of whose excretion may often be the reason for many symptoms of intoxication. Pregnancy causes certain changes in the position and condition of these organs. Resulting from the elevation of the diaphragm there may occur digestive disturbances, fatty liver and portal stasis; from the pressure downwards on the heart, hypertrophy of the left ventricle as well as circulatory changes in all internal organs. Therefore we may have intoxication and eclampsia without albuminuria, but, at the same time, the increased work of eliminating the large amount of toxic matter from the blood may induce in the kidney certain changes of structure which will show themselves in the character of the urine. The problem of auto-intoxication is not alone the anatomical condition of the emunctories, and of the renal emunctory in particular, but it consists in the sufficience or non-sufficience of these organs (58).

Certain changes in the placenta are noted in nephritis and albuminuria of pregnancy. Fehling (15) collected 2008 cases of labor without albuminuria from his observations in the

clinics at Strasburg and Basel. Examination of the placentæ in these showed white infarcts in 328 or 15 per cent. There were also 91 cases of albuminuria of which 44, or 48 per cent., showed placental infarcts. Thus placental infarcts are nearly thrice as frequent in albuminuric as in normal cases. In true nephritis almost all placentæ have one or numerous infarcts. These placentæ differ from those of syphilis. The latter are pale and heavy while the former are small, poor in blood, compact and thin. Often the fœtus dies before birth because the number of infarcts impairs the nutritive functions of the placenta. The cause of the infarcts is thought to be a nutritive disturbance of the decidua, mechanical stoppage of vessels, endometritis, etc. There are often fresh hemorrhages in the placentæ of nephritis and albuminuria, so that one sees red, yellow and white infarcted masses at the same time.

The toxicity of the urine eclamptics varies from time to time, but that of the blood serum increases enormously during the time of the convulsions. Ludwig and Savor reach this conclusion from the results of injections of serum and urine into animals. (57.)

Semmola (62) practiced subcutaneous injection of egg albumen in dogs. For the first day or two there was no lesion of the kidney but a continuance of the injections caused anatomical changes in the renal structure ranging from hyperæmia to chronic nephritis and large white kidney. Even the healthy tubules will allow the passage of albumen when in excess in the blood. He therefore considers albuminuria and nephritis as due to a dyscrasia such as acute infectious disease, toxæmia, rheumatism or gout. This theory fits well with the clinical facts of uræmia in child-bearing. There is passage of albumen, sometimes for several weeks and often in large amounts, while the urinary sediment shows little trouble with the kidney, and even the post-mortem examination demonstrates no

marked lesions. It will also account for those cases of eclampsia without albuminuria. In these cases the vicious blood state overpowers the nervous system and causes the convulsions before the passage of albumen occurs in the urine. Semmola thinks that albuminuria arises from a modification in the diffusability of the sero-albumen resulting from molecular changes in the blood.

When we come to consider the post-mortem appearances in cases of puerperal uræmia, we find a wide diversity in the findings themselves and in the interpretation put upon them by authorities. Indeed in a large number of cases accurate observers have found nothing abnormal in the gross or minute structural appearances in the kidneys. Thus Brummerstædt (63) collected 42 cases of eclampsia where the kidneys were examined and found 7 healthy, 8 slightly hyperæmic, and 24 showing slight exudation processes. Prutz (32) collects 63 cases besides those above mentioned and finds that the appearances of acute nephritis predominate and that contracted kidney is rare. Acute inflammatory changes were observed 29 times; chronic exudative changes 14 times; interstitial nephritis 13 times; sound kidney 5 times, and fatty and granular changes each once. Prutz examined microscopically the kidneys of twenty-two patients dying of puerperal eclampsia. From his examinations he is inclined to think that only about eight show enough kidney changes to account for the symptoms of uræmia.

It is not in the kidney alone, however, that we are to look for anatomical evidence of lesions. Pilliet (65) in all of 12 autopsies on eclamptic cases found in the liver hemorrhagic foci analogous to those found in the kidneys in scarlatinal and erysipelatous nephritis. Schmorl (66) found there foci in 15 cases; also changes in the kidneys, hemorrhages in the brain and, in five, necrosis of the pancreas and heart. In four of

the children were extensive changes in the renal epithelium. In 31 autopsies Loehlein (12) noted microscopical changes in the liver 5 times. Knowledge of the fact that we may have multiple liver cell thrombi gives a point of prognosis in cases where jaundice appears.

In the brain are found most often anæmia, œdema and diminished consistency; in the lungs œdema constantly and often emphysema; in the heart, emptiness and flaccidity; in the spleen, enlargement. (1).

In Duehrssen's series of two hundred cases of puerperal eclampsia there were 42 deaths. The post-mortem examination of the kidneys showed nephritis in all but one, which had renal anæmia. (44.) Anæmia of the kidneys is always found, according to Leyden, who introduced the terms "pregnancy-nephritis" and "pregnancy-kidney." The cause of this anæmia is taken to be the spasm of the kidney arterioles (46, 47, 48). The spasm is caused by the reflex irritation of the nerves of the genital tract. In the later months of pregnancy, when the symptoms of "pregnancy-nephritis" are most common, these irritations are at the maximum, namely, great distension of the uterus, the head pressing into the pelvis and the uterine contractions. The sum of all these irritations, perhaps reinforced by some particularly urgent neurotic impression, starts the spasmodic arterial anæmia of the kidneys. Following the anæmic condition, degenerative changes occur, often not marked enough for even microscopic demonstration but sufficient to cause albuminuria and other secretory disturbances which lead to a faulty elimination of urea and other toxins of the blood. Similar anæmia of the liver may interfere with the excretory functions of that organ and cause the not infrequent lesions found in it. Consequent upon this toxæmia may result the symptoms so often observed in the toxæmia of pregnancy; nausea and vomiting, œdema or anas-

arca, headaches, neuroses, cardiac symptoms, eclampsia and even mania.

The auto-intoxication of pregnancy exhibits itself in all phases from the slight œdema of the feet and headaches to the severest cases of eclampsia and puerperal mania. A typical case I herewith report from my practice :

Case 1. A. P., age eighteen, single, primipara, in the eighth month of gestation. This patient, a girl of good family from a neighboring state, came to Chicago to hide her shame from her acquaintances at home and was under the care for several weeks of a neighboring practitioner against the time of her travail. For the last few months she had noticed a gradually increasing œdema of the feet and ankles, extending up the legs. For the last month she had severe nausea and vomiting with pain in the right side. Lately she had passed a diminished amount of urine, but this had not been examined chemically.

In the absence from the city of her engaged attendant, I was one day hastily summond to her boarding-house, where I found lying on the bed a small young woman in a state of unconsciousness, with abdomen distended to full term size and legs very œdematous as far as the hips. She had already had two convulsions and, soon after my arrival, had a third. Having been uninstructed by the messenger, I was poorly provided with instruments or drugs. Meantime, while waiting the arrival of assistance and materials, I gave one-fourth grain morphine subcutaneously. During the fourth and succeeding convulsions chloroform was freely given. The position of the fœtus was O. D. P., the os was not dilated nor the head engaged and labor had not begun. The fœtal heart was never heard. The small amount of urine drawn by catheter showed abundant albumen by the heat test made at the bedside. Subsequently the microscope showed numerous hyaline

and finely granular casts, leucocytes and a few red corpuscles. After the arrival of Dr. E. T. Edgerly, who answered my summons, the fifth convulsion occurred and complete anæsthesia was induced preparatory to terminating the labor as rapidly as possible. There were no more spasms. We concluded to dilate the os manually, do version and extract by the feet. This proved a most difficult task. The vagina was so small as hardly to admit my hand and the bony outlet was narrow. The dilatation of the os by the fingers was not easy and we had no instrumental dilator. I was able to reach one foot and after great difficulty to pull down a second. I then pulled the legs down into the os and the feet into the vagina. The cord was tightly pulled into the fold between the legs and on account of the pressure of the partly dilated os, I could not disengage it. Therefore I tied in two places and cut between, trusting to rapid extaction to save the child if not, as I suspected, already dead. The head became arrested in the pelvis and each of us failed to deliver it either by the finger in the mouth or by the Prague method. Forceps succeeded after three trials. The child of course was dead. It was a male, seemed at full term and weighed six pounds. The delivery occupied two hours, being difficult at every step. The mother was somewhat shocked at the end of it. The placenta followed immediately and the uterus contracted well. Treatment was addressed to the shock and no attempts were made to repair the lacerations.

Four hours after delivery there was some slight twitching of the right hand, and an hour later, after taking hot water, she vomited some dark brown matter. She passed a fair night, the pulse gradually improved and she took a little milk. She was catheterized twice during the first eighteen hours after delivery, each time voiding three ounces of albuminous urine. During the second twenty-four hours two pints were

drawn and on the third day she urinated freely while the œdema began perceptibly to diminish. The urine contained a trace of albumen, few casts and much pus, probably from the lacerations. Cultures of the sediment produced only the streptococci. On the fourth day the temperature rose to 101 F. and the breasts contained a little milk. Binders were ordered and salts given to free catharsis. The fever soon subsided and convalescence thereafter was uninterrupted under the influence of free diuresis from copious water drinking. Four weeks after the labor, she went home, still having a trace of albuminuria; a few weeks later I received a specimen of urine that was entirely negative, and a few months after I learned of her complete restoration to health.

Here was a case in which no examination of urine had been made and no eliminative treatment instituted. Doubtless, several months earlier, signs of pregnancy-nephritis would have been found if sought and prophylaxis might have saved her from the dangers of eclampsia and of forcible delivery. Our treatment is open to the criticism of the followers of the French school, who advise waiting for labor to begin and refraining from accouchement force. Critiscism may be directed to my use of podalic version instead of high forceps. I chose version, first because the os was not sufficiently dilated for the easy application of forceps; second, because version and traction on the feet also help to dilate while extraction is being applied; third, because high forceps are more liable to injure the uterus; and lastly, because personally I can more easily perform version than I can the high forceps operation.

The next case which I report is also that of a patient who exhibited many signs of pregnancy-nephritis, but who had no prophylactic treatment during pregnancy because of her unwillingness to submit to treatment. The termination of this case was fatal, but I think milk diet and treatment directed to

the uræmic condition during the later months of her pregnancy, when the condition was recognized, might have made our task during the labor more easy and perhaps have prevented her even from having eclampsia at all.

CASE 2. Mrs. S., aged 21, a plump, healthy primipara. The family and previous histories are negative. In the latter part of March, 1893, she engaged my partner, Dr. Denslow Lewis, to attend her in her forthcoming labor, estimated to be due April 23d. The routine examination of the urine showed albumen in large quantities and high specific gravity. She was at once ordered on milk diet and was prescribed diuretics and laxatives. The advice as to diet was not followed and little medicine was taken in spite of frequent warnings as to the serious state of affairs. The patient's mother was a graduate of law, an erratic woman, who thought her knowledge of medicine little inferior to that of any physician, and she had complete influence over her daughter and son-in-law. No warning nor persuasion could convince them that there was any reason to expect anything more than the normal phenomena of labor.

Daily examinations of the urine showed large amounts of albumen. Oedema was not more than is usual at the last month of pregnancy.

The daily amount of urine could not be ascertained, but it seemed not to be very scanty.

April 9, 3:30 A. M., the doctor was called on account of the onset of labor pains.

Labor was found to be well advanced and the os the size of a silver quarter-dollar. It progressed well for a primipara; at 5:30 A. M. the doctor went to his office for forceps and other implements, remaining away for about an hour. Responding to a hasty summons, he learned that the patient had just complained of a severe headache and had then been

seized with a spasm involving the whole body. The os was now thinned and dilated to the size of a silver half-dollar. It was further dilated with fingers and Tarnier's ecarteur. Axis-traction forceps were applied, delivering the fœtus in about half an hour, with a partial tear of the perineum. Several spasms occurred during the delivery, and for an hour afterwards, in spite of chloroform anæsthesia. At the onset of the spasms the mother of the patient became willing and anxious to have all the professional assistance possible. A nurse was obtained and I was called, arriving about 8:45 A. M. The placenta had been delivered and the uterus was well contracted. We gave chloroform at the beginning of each spasm, with the effect of partially controlling them, but without diminishing their frequency. Pilocarpine gr. 1-10 was given subcutaneously at 9:15 and again at 9:30, producing little sweating, but profuse salivation and secretion of mucus in the respiratory passages. At 9:50 another spasm. At 10:45 chloral gr. xl was given by enema. At 11:10 another spasm; 11:15 chloral enema was repeated. At 12:30 twenty more grains of chloral were given as before. After this there were no more convulsions, but a gradually deepening stupor came on. At about 11 A. M. we rigged up a hot-air bath by means of a stove-pipe, a lamp, barrel-hoops and blankets. This induced profuse sweating and easier breathing, but some quickening and weakening of the pulse. From 11:30 to 12 there was some cyanosis which soon disappeared.

At 4 A. M. the catheter had drawn a few ounces of urine. Three other times during the day the bladder was found to be empty. Several enemata of Epsom salts during the day as well as croton oil and large doses of calomel failed to cause action of the bowels. Most of the day the patient remained in a stupor with stertorous breathing. The hot-air bath was removed at 2 P.M. and replaced at 7, the second time producing

no diaphoresis. Pilocarpine again failed to do more than fill up the respiratory passages with thin mucus. From 5 P. M. the pulse grew steadily weaker and the woman died quietly at 9:30 P. M. without having regained consciousness. The child, a vigorous boy, lived for several months.

Here is a case of a healthy young woman whose pregnancy up to the last month was apparently normal, dying within fifteen hours of acute toxæmia. Indeed, if not for the routine examination of the urine, a fortnight before labor, there was no symptom until the first spasm just before the delivery. Noteworthy is the failure of the attemps to induce elimination even by active medication by cathartics as well as the failure of pilocarpine to produce sweating. Samples of the same package of the latter drug were proved active both before and since.

There may be room for doubt as to the propriety of giving so much chloral. After the last dose the convulsions ceased but a state of stupor persisted more or less unto death. In almost all reported cases death comes during the stupor, even when no large dose of narcotic drugs has been given. The uræmic poison seems to produce an epileptiform state, viz., of convulsions followed by coma. In this case we were unable to set up by any treatment enough vicarious elimination to carry off the hæmic toxins.

While in general the presence of the fœtus in the uterus and the supervening of labor pains seem to be the direct causal factors in most cases of puerperal eclampsia, yet in a considerable number of cases the convulsions begin after the delivery, sometimes without the least premonition even in the urine. (2). In Goldberg's series of eighty-one cases of eclampsia (14) thirteen had the first convulsions during the puerperium. The following case is one where spasm occurred without warning of any kind and a few hours after the attend-

ing physician had left. For permission to report this case I am indebted to Dr. M. W. Bacon.

Case 3. Mrs. McM., age about 25 yrs., primipara. First stage lasted about ten hours, forceps were applied to deliver the first twin, a male, about four hours later. The second birth, that of the female twin, soon followed spontaneously. The urine was not examined before labor. No sign nor symptom of uræmia was present and urine was passing freely at all times. Six or eight hours after the delivery of the second child and some hours after Dr. Bacon had gone home I was summoned in haste on account of a convulsion then in progress. It had almost ceased when I arrived but the comatose condition lasted a few minutes after my coming. I gave one-tenth gr. pilocarpine subcutaneously and produced copious sweating. Dr. Bacon, who arrived about an hour later, repeated the dose and also gave jalap and calomel in free doses. There was only one spasm and urine passed freely a few hours afterwards. Albuminuria persisted for a few days but the patient made a good and speedy convalescence.

The urine, in cases of puerperal and pregnancy uræmia, is generally acid, contains albumen in varying amounts, usually shows fibrine casts and blood corpuscles. The quantity of the albumen usually has an intimate relation to the extent, intensity and duration of the acute Bright's disease, but not so constantly to the violence of the eclampsia The albuminuria, however, usually increases towards the end of pregnancy. The urea is constantly diminished, sometimes entirely wanting. The more acute the nephritis the darker the urine and the more numerous the blood corpuscles. Eclampsia in the second half of pregnancy has generally premature labor as a result. (1). There is a class of cases where the urine is free, even amounting to polyuria, and the specific gravity is low, while the albuminuria is slight but which results in eclampsia

sometimes fatal. (7). Such cases are very liable to take even the careful practitioner unawares because the albuminuria may be easily overlooked in a hasty examination. A low specific gravity with a trace of albumen, even when there is apparently a large quantity of urine passing, should lead the obstetrician to get a measurement of the daily amount and estimate the urea, for this last is a better indication of the integrity of the kidneys and eliminative organs than even the presence of albumen or of casts. During the increased metabolism of pregnancy there should be an increased daily amount of urea voided, so that any notable diminution is a sign of danger.

Prophylaxis, especially dietary, fortunately has a marked influence upon the progress of a case of the uræmia of pregnancy. For this reason, if for no other, there should always be frequent examinations of the urine of all pregnant women, especially primiparæ. The two following cases are examples of the benefits of the ounce of prevention.

Case 4. Mrs. J. E. G., age 27 years, primipara, nervous temperament, large, healthy woman, who had seldom had a sick day. The last menses occurred June 17, 1894. In January, 1895, the first examination of urine showed large amount of albumen and inquiry developed the fact that she was passing small daily quantities of urine. There was slight œdema of feet, ankles and hands, as well as some puffiness of the face. She complained of slight headache and a little return of nausea. Throughout her pregnancy as throughout most of her life she had thought her health excellent, but she had eaten largely of meat during the pregnancy. I ordered an absolute milk diet and cream of tarter water freely. At that time the amount of urine passed in twenty-four hours was less than one pint and the total amount of urea was much diminished, although the relative amount in any one specimen

as well as the specific gravity were high. A faithful persistence in milk diet for three weeks resulted in a diminution of the œdema and complete subsidence of the uræmic symptoms. The daily amount of urine was 2000 to 2500 c.c. the albumen was one quarter of one per cent., the urea was not below normal, there were a few hyaline and granular casts, the specific gravity was 1010. A week before this time the urine for one day was ony 1200 c.c. the urea about 0.15 per cent. and specific gravity 1012. That day she had headache and nausea with cramps in the lower abdominal mucles and legs. A hot bath and alcohol sweat resulted in the passage next day of 2000 c.c. and a disappearance of all symptoms. A bath and sweat were ordered every third day for a fortnight. Early in February she though thè fœtal movements were not so active as before but they were still perceptible up to the day before labor. There was a slight reddish discharge from the vagina.

March 1. 1895. Slight pains began about midnight and continued until morning, but were not severe enough for her to send for me or her nurse. The child was born quickly at about 10 A.M., ten minutes before my arrival, dead. It was blue, but not macerated, and efforts at resuscitation were futile. The placenta, of small size and without infarcts or other abnormal characteristic, followed spontaneously in fifteen minutes. The cord was of small caliber. The mother made an uneventful convalescence, albumen and casts disappeared from the urine in a few weeks, and she has never had any symptom of uræmia since. About eighteen months afterwards she had a healthy baby in a manner entirely normal as regards every symptom from the beginning of the pregnancy.

Autopsy: Female fœtus of eighth month, length 17 in., weight 5¼ lbs., nails to ends of digits, abdomen distended and dull on percussion, vulva open and everted, skin and subcutane-

ous tissues of chest and belly about ⅓ in. thick with œdema, abdominal and pleural cavities full of serum, pericardium contains about half a dram of serous fluid, vein of round ligament patulous, bladder contains about half a dram of urine, colon contains meconium with which also the body is freely covered, lungs contain no air and sink in water, the kidneys are enlarged. The cortices of the kidneys are pale and the pyramids injected, in the left kidney the cortex is somewhat swollen. All the internal organs are passively congested.

Microscopical examination by Prof. Ludwig Hektœn gave negative results. There was some parenchymatous degenertion of the epithelium lining the convoluted tubules; the lungs were atelectatic; no change in liver or spleen.

Case 5. Mrs. W., age about 32 years, tertipara. There is nothing of interest in her previous family history. She has never had any serious illness nor trouble in labor nor in previous pregnancies. Early in March, 1892, I was engaged to attend her in her third labor, estimated to be due in the middle of July. The routine examination of the urine was negative. Late in May she called on me complaining of swelling of the feet and a diminished excretion of urine. Examination showed considerable albumen, normal specific gravity, and abundant sediment consisting mostly of bladder and vagina epithelial cells, leucocytes and few hyaline and granular casts. I ordered a milk diet and an iron tonic. The urine was examined every few days and remained much the same except for the disappearance of the flat epithelium.

June 14 I was called in the night on account of pains in the abdomen simulating labor pains. Under chloral and belladonna these quieted. I ordered a hot bath twice or thrice a day and had the nurse summoned. The baths caused her to sweat in a gratifying manner, but the amount and condition of the urine remained unchanged. A few days later I or-

dered chloroform water for a diuretic, as recommended by Charpentier. The daily amount of urine increased somewhat but the albumen did not change. The urea all the time was only slightly diminished. The milk diet and baths were very irksome to the patient, but otherwise she did very well. June 30 I was called and found labor in progress. The course was normal and speedy. The child, a female, was small but well developed, and is alive and well to-day. The evening before the labor the mother passed urine very freely and continued so to do for several weeks. The œdema vanished in a week as well as the albuminuria. Several examinations since for the last four years have been negative. About three years ago she consulted me for a diminution in the amount of urine, but repeated examinations showed nothing abnormal and the oliguria soon disappeared.

A noteworthy feature of this case is the occurrence of uræmic symptoms in the third pregnancy while in the two former, although the urine in each was carefully examined, there was not so much as a trace of albuminuria.

The vast majority of instances of uræmia of the childbearing period show symptoms during the latter half of pregnancy, and usually after the seventh month. It is uncommon for symptoms to appear before the fifth month. Occurring before the seventh month they are always fatal to the fœtus and therefore call for no modification of the treatment in the direction of preserving the life of the offspring. (44.) The following case is an example of the setting in of fatal uræmia in the first half of pregnancy.

Case 6. Mrs. W., age 18 years, primipara, always in good health, pregnant about four and one-half months. She had the usual morning nausea in the early weeks of pregnancy, and at the end of the third month had an attack of severe vomiting, epigastric pain, headache and anuria, lasting

several days. She seemed to thoroughly recover her health, although there is no record of any examinations of the urine. She never had any œdema. At the time mentioned above she came under the care of Dr. George V. Hilton, to whom I am indebted for permission to report the case, suffering from the same symptoms as during the previous attack. There was no urine passed for two days, in spite of diuretics and diaphoretics. There was almost constant nausea and frequent violent attacks of vomiting, with severe headache and epigastric pain. Two days after the beginning of the attack I saw her in company with Dr. Hilton, late in the night. She had been comatose for several hours and we found her in that condition with a very weak pulse and shallow respiration. A few drops of urine drawn by the catheter was only moderately albuminous. Her condition was so apparently hopeless that, in view of the time necessary to empty the uterus at that early stage, we determined to wait a possible rally. She was ordered a sweat-bath, but she died during the next morning, without recovering from the coma. No autopsy was permitted.

The failure of the urinary secretion may take place quickly and the bladder being found full, does not prove that urine is still being excreted by the kidneys. Richardson (7) reports a case of a primipara confined normally from whom within five hours later was drawn 40 oz. urine. This was pale, specific gravity 1007, and not albuminous. 1½ hours afterwards she had headache, epigastric pain, and a series of convulsions. Five hours after the last catheterization she was catheterized again and three ounces of smoky-colored urine was drawn, specific gravity 1022, albumen half per cent. and containing blood, granular and epithelial casts. Before thirty-six hours had gone by the symptoms under treatment had entirely disappeared and the urine had become normal. Mother and

child were both reported well. Another case is reported by Gage in which the period of diminished urine was not over six hours. Both mother and child died. (7, p. 272.)

The relation of albuminuric retinitis to the pregnant, parturient and puerperal states is important. The danger to sight is great, although in the retinitis albuminurica of pregnancy the disease is less severe than in other renal disturbances. The appearance in the retina are hazy, optic discs, white patches in the macular region, and more or less hemorrhage, although often there is complete blindness without visible alteration in the retina. This blindness frequently ends soon after labor, and the longer it lasts the worse the prognosis for sight. (68.)

Judging from the average of the majority of observers, we may say in general that of ten thousand pregnant women, five hundred will have albuminuria ; of these five hundred albuminurics sixty will have eclampsia, and, of these sixty eclamptics, twelve will die.

The lethal dangers of the uræmia of pregnancy arise mostly from placental disturbances or through the occurrence of eclampsia. (69). The outcome depends largely upon the apparent severity of the immediate symptoms. As to the proportion of cases of pregnancy-kidney and pregnancy-nephritis which eventuate in chronic or recurring renal disorder, there is little definitely settled by authorities. It appears from the researches of Leyden (70) and also of Ries (71) that granular atrophy is not a very infrequent ultimate result of renal disturbance arising in pregnancy. Koblanck (69), in an article on the Prognosis of pregnancy-nephritis made some investigations in Olshausen's clinic in regard to this point. He studied 77 cases in which he had an opportunity to examine the urine some time after the labor ; from six weeks to five years, averaging about two years afterwards.

In these cases the history showed that renal disease had not existed before the labor. Three-fourths of the women were young primiparæ. Most of them had severe symptoms, being brought into the hospital in spasms. The later examinations were chiefly as to pulse, heart and urine. In the urine of 48 a normal condition obtained; in 13 there were traces of albumen with very few casts; in 12 the urine showed "catarrh" of the uropoietic system, and in 5 only was there a true nephritis persisting. Of the 46 healthy women, fifteen had borne children again without symptoms of uræmia and five were pregnant at the time of examination. Neither the persistent nephritis nor the persistent albuminuria seemed to have any relation to the severity of the symptoms in the first place. There was only one case of the 77 which had uræmic symptoms recurrent in later pregnancies. She was examined eight years after the first delivery, after having three out of four pregnancies complicated with renal symptoms and, at this final examination, the urine was normal. From Koblanck's figures then it appears that continuance of renal disorder after the labor or recurrence of the nephritis in future pregnancies is comparatively rare.

In any individual case the prognosis is worse the earlier in the pregnancy the uræmic symptoms begin, on account of the difficulty in extracting the fœtus as well as because the causal factors must continue for so long. The occurrence of eclampsia must be taken as the indication of the culmination of the uræmia. In very few fatal cases has there not been eclampsia sooner or later. Indeed the spasms may be few or very slight while the dominant feature is deep coma which will end in death unless overcome by nature's forces or treatment. The condition of the pulse is of great prognostic importance. In favorable cases it is impaired during the attacks, but full, regular and not greatly accelerated during the intervals.

Even a hard pulse is not so bad a sign as one which is weak and fast, especially between the attacks or after the termination of the labor. (2). Amaurosis occurring during pregnancy is a bad sign, both as indicating the imminence of spasms and for its danger to the eye-sight in the future. According to the tables of Lœhlein (12) the greatest mortality is among the multiparæ in whom the eclampsia begins before labor, and the least among the primiparæ first affected post-partum. The former were twelve out of thirty-four and the latter seven out of sixty. In any case the prognosis is best if the outbreak occur first during the puerperium and worst during the pregnancy. Goldberg's (14) tables show a mortality of 39 per cent. in the ante-partum, 29 per cent. in the intra-partum and 19 per cent. in the post-partum cases. In the Boston Lying-In Hospital cases these figures were respectively 38 per cent., 23 per cent. and 19 per cent. (8).

The life of the fœtus is in danger so long as it is nourished by the poisoned blood of the mother. (1.) Lœhlein and Scanzoni had infant mortalities in cases of eclampsia of the mothers of 44 per cent. Schauta of 24 per cent., Winckel of 77 per cent., (2) Dührssen of 54 per cent. and the Boston Lying-In Hospital of 24 per cent.

The practical question is not so much whether the convulsions begin before, during or after labor, but whether emptying of the uterus causes them to cease. Dührssen, out of 118 cases, found that the eclampsia stopped immediately or soon after emptying the uterus in 105. Of these 105 cases 17 mothers died, a mortality of 16 per cent. Of the 13 cases where the eclampsia increased post-partum, 5 died, a mortality of 39 per cent.

A not very infrequent sequel of uræmic poisoning in the pregnant woman is mania or less severe psychosis. It seems to be intoxication neurosis like the mania following puerperal

infection. Olshausen (72) observed psychoses follow in eleven of 200 cases of eclampsia. From his own and the figures of three other authors he concludes that such mental disorders follow in six per cent. of cases of puerperal eclampsia. There seems to be little relation of the severity of the uræmic condition to the mania, although the latter seems to follow more often cases of deep and prolonged sopor. The patients woke to consciousness but in an impaired mental state, somewhat analogous to the psychic disease which may follow poisoning of alcohol, morphine or sepsis. Most of such cases recover in a few days or weeks. The mental abnormality in some cases may be only a more or less marked amnesia. (73).

That women suffering from uræmia of the child-bearing process are more liable than others to sepsis, except as they are more liable to operative interference and to the less careful asepsis engendered by haste, does not seem to be shown. The coma and convulsions may cause inhalations of mucus resulting in broncho-pneumonia or other infection of the lung, which also is favored by the venous stasis in that organ. Placenta previa rarely co-exists with uræmia, and it is possible that the free bleeding due to the former may have a favorable influence upon the course of the latter. (74). As placenta previa occurs only about once in one thousand cases of parturition and then six times oftener in multiparæ than in primiparæ while the grave uræmic accidents occur chiefly in primiparæ, it follows that their coincidence must be extremely rare.

Prophylaxis is of the utmost importance in the treatment of the uræmia of pregnancy, since by proper dietary very many cases of severe intoxication may be nipped in the bud. The occurrence of albuminuria or other symptoms of faulty elimination, such as low specific gravity, small daily amount of urine, headaches, nausea, etc., should be the signal to put the patient at once on a milk diet—exclusively milk for a while

until the cessation of the alarming symptoms indicates more latitude in the menu. The diet throughout the rest of the pregnancy should contain little of the red meats or other food likely to cause an excess of the nitrogenous contents of the blood. The pregnant woman with albuminuria should not travel for fear of the excitation of the genital organs produced by the jarring of a railroad train. (75). Iron and other tonics should be used for the anæmia which is often present. Mild diuretics and drinking of much water should be advised. Warm baths or Turkish baths are useful and not at all dangerous unless in excess. Laxatives, preferably the milder salines, should be given as often as needed to keep the bowels free.

Should prophylaxsis fail there comes up the question of interference with the pregnancy. If, in spite of proper effort and of proper co-operation on the part of the patient, the symptoms should continue to become more grave, especially should the daily amount of urine continue to diminish and the total urea to remain low, I think the weight of present authoritative opinion would advise induction of labor. As in the incoercible vomiting of pregnancy, each case must be duly considered by itself as to when the time for interference has come. Of course the method employed to induce labor will depend upon the time of the pregnancy. As the very first labor pains are likely to excite convulsions, it is imperative to be as quick as possible. Manual dilatation, Barnes' bags, instrumental dilatation, Tarnier's ecarteur or the deep cervical incisions of Dührssen will be used according to the circumstances of the individual case. Charpentier and the French as a rule advise waiting for the natural supervention of labor and ending it naturally if possible. (76). They entirely discard forced labor and Cæsarian section in eclampsia, preferring the use of chloral to the point of narcosis. Dührssen

and many of the Germans advise immediate and even forcible delivery in eclampsia or when that is imminent, always under deep chloroform anæsthesia. Between these comes the great body of the profession, which adopts a middle course within these wide limits.

The fact that, in eclampsia continuing after labor, there seems to be a decided benefit observable from free hemorrhage, points to the rationality of blood-letting at any time when spasms occur. This procedure seems more beneficial in those acute cases, accompanied by much œdema, large amount of albumen, sudden onset of uræmic symptoms, full bounding pulse and cyanosis. In such an array of conditions, if ever, bleeding seems rational, whatever the cause of the convulsions may be, whether uræmia, heat-stroke, epilepsy or what not. Without doubt it has almost always, under such circumstances, been immediately beneficial in puerperal uræmia, but there is question whether it does not do more ultimate harm than good. The relief may be immediate, but as the volume of the blood returns to normal by the inbibition of water from the alimentary canal and the tissues or from hyperdermoclysis, the tension returns (2) and we are then confronted by the former conditions with the addition of an acute anæmia. According to Leyden's idea the very lesion in the kidney is anæmic. Therefore, while it may be justifiable in the plethoric to do phlebotomy in order to gain time for the action of eliminative drugs and for obstetric interference, yet the procedure is dangerous and should not be carried to any great length. Venesection was the treatment in Guy's Hospital before 1868 and the mortality in puerperal eclampsia was 30 per cent. Since then it is 20½ per cent. under the treatment by chloroform. (77).

Since the overwhelming weight of opinion is that the eclampsia is caused by faulty elimination and since the vast majority

of authorities recommend measures directed to favoring elimination by the skin, bowels and kidneys in the early stages of the intoxication, it would seem to follow that radical means ought to be employed in that direction when the graver attacks come on. Such is the justification for the use of pilocarpine, hot-air, elaterium and the drastic hydrogogues. One should remember, in employing these measures, that they all tend to weaken the heart and that upon the maintenance of the cardiac strength depends our hope of recovery. They should be used only with caution and in cases where the pulse is of good quality, unless they be used as forlorn hopes after other measures have failed.

Veratrum viride has been used, especially in this country, since its introduction by Fearn of Brooklyn in 1869 (85) in cases of uræmic attacks of all kinds, and it has vigorous partisans in the convulsions of child-bearing. Jewett (78) refers to 22 cases in only one of which did convulsions recur after treatment had been established. He advises its use subcutaneously in doses of 10 to 20 minims until the pulse rate has been brought under 60, when, in his experience, spasms will not occur. Similar good results have not been obtained in England from veratrum. (79.) In American literature, there are very many favorable reports of cases, but nobody has, as far as I know, published a series of cases covering any length of time giving both sides of the statistics of the use of veratrum. Many who recommend veratrum also advise and use rapid evacuation of the uterus under chloroform anæsthesia. In an affection where so much depends upon maintaining the force and regularity of the heart, it seems to me very heroic and dangerous treatment to employ to its toxic action so powerful a cardiac depressant as veratrum with the aim of controlling the spasms, which are themselves only a symptom of serious poisoning of the blood and of a vicious nerve state

kept up by the presence of the contents of the gravid uterus. It would require very encouraging statistics indeed to induce me to trust alone to any method which avowedly only controls the visible explosions of the disease to the exclusion of measures calculated to eliminate the poison if possible and to terminate as soon as safely can be the condition of pregnancy, which is at the bottom of the whole trouble.

In 1887 Gustav Veit (80) strongly recommended morphine in large doses for puerperal eclampsia. He begins with a dose of half a grain and follows it soon with a smaller dose unless the narcosis is complete. He gives another dose as soon as consciousness begins to reappear and keeps the patient in that condition for hours or even days until the child is born and the tendency to spasm ceases. No other treatment is recommended. Olshausen favors the morphine treatment but would permit forceps or version in the interest of the child, if these operations could be easily performed. The action of the narcosis paralyses the voluntary muscles and thus stops the attacks which in themselves tend to increase the arterial pressure and consequently the morbid condition in the kidneys and in the brain. The prognosis for both mother and child is said by the advocates of this treatment to be better than by any other method. Lœhlein (12) claimed that it had reduced the maternal mortality to 14 per cent. and that the infant mortality had been reduced to 41 per cent. Dührssen (44) criticises Lœhlein's statistics both as to their accuracy and on the ground that they embrace too few cases to be of value. In the latter's collection of 325 cases of eclampsia from all German clinics were 86 cases where the morphine treatment had been used, not however by any means to the exclusion of other measures. In these 86 cases 12 or 14 per cent. died, *excluding complicated cases.* The general mortality of the whole 325 was 19 per cent.

Some difference of opinion will always exist as to what cases, in a series given to prove percentages, ought to be excluded on occount of complications.

The advocate of prompt obstetric interference in cases of the graver uræmic manifestations in pregnancy base their claims upon various considerations. In the first place, it is known that in the vast majority of cases the spasms cease or grow less severe as soon as the child is born, therefore the sooner that is brought about the better for the patient. The chief reason for not inducing labor is that the manipulations to that end will of themselves precipitate convulsions. This is not the case if the patient is under complete narcosis. Therefore, if narcosis be complete and the operation be done quickly, the patient is soon brought out of the condition of intoxication and of spasm, and stands a better chance of recovery than if allowed to remain therein, while the convulsive phenomena are palliated by cardiac depressants or by prolonged dosing with large amounts of morphine. The great trouble, especially in young primiparæ who are the most subject to these attacks, is that it is very difficult to artificially empty the uterus with dispatch. The earlier the eclamptic seizures begin the harder to induce the labor. The accouchement force is apt to be dangerous of itself. Dührssen devised an operation to overcome this difficulty. In the primipara, after the head has become engaged in the pelvis towards the last few weeks of pregnancy, the body of the cervix becomes taken up, and, though the os may be as tight as a pinhole, yet the cervix is stretched over the protruding head in a thin layer. The main time in inducing labor is taken up by the dilatation of the os. Dührssen (44) makes incisions laterally and, if necessary, anteriorly and posteriorly completely to the vaginal attachment through the cervical tissue, thus entirely and at once obliterating the period of dilatation

of the os. Then he turns or applies high forceps and delivers at once, perhaps doing episiotomy if there is difficulty in passing the head over the perineum. He claims that the incisions thus made usually heal without incident, or can be repaired like ordinary lacerations. The patient is thus at once brought into the puerperium and, if the eclampsia continues, the other means mentioned may be used against it with the very favorable circumstance that now the pressure of the distended uterus is eliminated from the causation. In a symposium at the Boston Obstetrical Society these conclusions were reached : That nothing is gained by delay in puerperal eclampsia ; that the continuous administration of anæsthetics has not been known to allow of the reappearance of the convulsions, and that slow manual dilatation and emptying of the uterus has been repeatedly successful. (81.) Dührssen's method now makes this slow manual dilatation unnecessary. In multiparæ the internal os is usually not open nor is the cervix flattened out over the head so that, in such cases, manual or instrumental dilatation must be employed instead of the deep cervical incisions. Where immediate delivery in eclampsia is imperative, even Cæsarian section has been strongly recommended. (82.) Puech (83) considers that in a pregnant woman, if the albuminuria persist in spite of milk diet, and especially if it be accompanied by gastro-intestinal symptoms and dyspnœa, the maternal interests demand the induction of labor. Indeed, modern opinion seems to be tending in this way, towards ending the pregnancy as soon as it is evident that the uræmic symptoms are not being controlled by the dietetic and diuretic treatment, and not to wait until the graver accidents, such as coma or eclampsia, come upon us unawares.

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DISCUSSION.

Dr. Emil Ries, Chicago: *Mr. President*—Dr. Lewis mentioned a paper that I wrote upon this subject some ten years ago and as the question comes up again at this time I should like to say a few words. Dr. Lewis has advanced the theory of auto-intoxication of uræmia in the causation of eclampsia. I must say that I do not think this theory has been well established or proven to be true. Several theories as to the cause of eclampsia have been advanced, but none of them to my knowledge have been perfectly proven. The latest theory that has been brought forward for consideration is the infectious theory, it being held that eclampsia is produced by some infectious agent, but so far the micro-organism of eclampsia has not been demonstrated.

Another point which I would like to mention in connection with the paper is the treatment, because this is the feature which to the general practitioner is of the highest importance. Called suddenly to attend a case of eclampsia, what does he do? He dilates the os manually and rapidly, and delivers the child, occasionally bringing into the world a living child and perhaps saving the life of the mother. But this is not always the case, as well illustrated by the cases reported by Dr. Lewis. In the first case the baby died; in the second, both baby and mother died. Eclampsia was present. If the mother died from eclampsia, we do not know it. In the second case, I understand there was rapid dilatation of the os, and the axis-traction forceps was applied. I have had the opportunity abroad of studying cases of eclampsia, as when the patients died we had them post-mortemed in every case. I have seen tears after rapid delivery extend from the cervix clear up into the broad ligament and retroperitoneal connective tissue, with the hematoma extending clear up to the kidney. These tears are the consequence of the rapid delivery and are the causes of many a death which is attributed to the eclampsia itself unless a post-mortem shows the true nature of the case.

Recently a new operation for rapid delivery has come into use, and that is vaginal-Cæsarean section. It has given good results in certain

cases. I wish to say, however, that one who is not experienced in vaginal operations should not attempt to perform this operation before he has done similar work on the non-pregnant womb. I would also give warning not to attempt the operation without sufficient assistance. It is not an operation that can be done in a farm-house without any assistance at hand. If it is done with proper assistance, it is a good operation, and better than rapid manual dilatation of the cervix because you can easily control the hemorrhage.

Dr. William Catto, Decatur: This is a most important subject, and, as a practitioner knows, no disease is more frightful in its appearance or more disastrous to women in confinement than puerperal eclampsia. A few years ago, at a meeting of the Mitchell District Medical Society of Indiana, I had occasion to present a paper on this subject, and I made the remark that the time would come when the death rate from cases of puerperal eclampsia would fall below five per cent., and I have had no reason since to change my mind.

The treatment is the all-important feature in this class of cases, and it matters but little to the practitioner and the patient what the prime cause of the eclampsia may be. The probabilities are that the eclampsia is similar in character, and due to those conditions producing uræmic convulsions in advanced cases of Bright's disease. However that may be, the treatment I have found most efficient in this class of cases, and as statistics will show has given the best results, is bleeding and rapid elimination. I readily understand that bleeding has fallen into disrepute in many instances, but I believe where its use is not attended with success in eclampsia it is because patients are not bled enough. In a series of fifteen cases, thirteen of whom were bled, I have had two deaths. I have had four still-born children in that series. The first case died in convulsions because I did not bleed enough. In the light of after experience I am convinced that had I taken four times as much blood as I did, her chances of living would have been much enhanced. I have never seen a patient who would not stand more or less loss of blood, and bleeding may be practiced until she gasps for breath in nearly every instance.

The time at which eclampsia is most apt to occur varies from the fourth to the ninth month, and may occur after the woman has been delivered. The treatment may be summed up in the word "elimination," and the quickest method of elimination is bleeding. After this secure prompt and free action of bowels and skin.

As to rapid dilatation of the os, this is a matter that should receive some consideration. In most cases it will not be called for where the woman is sufficiently bled. So far as morphine, chloral and other

drugs are concerned, I believe they increase the danger of the patient by simply causing stupor, at a time when more vigorous methods should be used.

DR. LEWIS (closing the discussion): In the part of my paper which I did not read on account of time, I spoke of one form of auto-intoxication, but that has not been definitely proven.

As to lacerations or tears from rapid delivery, I think Dr. Ries' note of warning is timely, and I have no doubt many tears are produced in this way.

With reference to delivery by cervical incisions I did not reach that part of my paper, but I would mention it at this time to approve it in a great many cases, particularly in such cases as the first one reported by me. In primiparæ, where the head is pressed down so far into the cervix that its walls are completely thinned out, there may be only a pin-point opening of the os, but it is safe to pursue the method of Dührssen. It obliterates immediately the period of dilatation of the os. The operation takes very little time, and there will be no further tearing. In the experience of Dührssen there has been no tear into the broad ligament or further laceration into the pelvic tissues.

With regard to the remarks of the other gentleman who discussed my paper (Dr. Catto), in which he said he had but two deaths out of thirteen cases in which he had resorted to bleeding, I must take issue with him as to the statement that all of these patients will stand bleeding. That has not been the experience of most observers. According to Guy's Hospital Reports, the mortality under venesection was much greater, about thirty per cent. before 1868. Of about 53,000 labors reported by Löhlein there were 325 cases of eclampsia, and a careful analysis of them shows that bleeding is not so efficacious a measure as the Doctor would lead us to believe. At any rate, those who have resorted to venesection have not been so fortunate in their results as the Doctor has been.

AN IMPROVEMENT IN THE TECHNIC OF THE AFTER-TREATMENT OF PERITONEAL SECTION.

BY HENRY T. BYFORD, M. D., CHICAGO.

After having had my share of deaths from peritoneal section during several years of work, I was impressed by the almost invariable association of intestinal paralysis or obstruction with death from septic peritonitis. In cases operated upon before the development of the aseptic technic as we practice it today, the septic infection was so prominent a factor that, in those days, it could not but be considered as the cause of the paralysis or obstruction. But since septic influences have been largely excluded from the operating room, my observation has been that the intestinal paralysis or obstruction has come to be, more often than not, the cause of the fatal sepsis, either wholly or in part. Ordinarily the peritoneum can take care of the small amount of sepsis that gains entrance to its cavity during a properly performed section, but when the intestines are paralyzed a slight infection not only has a chance to develop, but sepsis finally finds its way through the stretched intestinal walls.

The following facts and considerations led me to adopt this view:

I noticed that bad results always followed prolonged exposure or repeated handling or eventration of the intestines, as well as difficult enucleations undertaken without the help of Trendelenburg's position; that severe operations of one and two hours duration, in which the intestines were kept covered

and not disturbed, were followed by but little reaction or other constitutional disturbance; that in many cases of such intestinal paralysis the patient's temperature did not rise until a few hours before death; that almost complete intestinal obstruction would, in some instances, persist for a week or so after the operation unaccompanied by temperature, when at last the obstruction would become complete and the temperature go up before death supervened. I also noticed, as has almost every operator, that no matter how sick the patient, her condition rapidly improved, and she nearly always got well, when flatus could be made to pass freely per rectum; and I soon found that this could almost invariably be accomplished, even in the most unpromising cases, if the attempts at it were begun early enough. We all know what a decided change came over the statistics of ovariotomy when the pedicle was dropped into the abdominal cavity instead of being fixed in the external wound, and we know how frequently it was shown at autopsies that the intestines became obstructed or paralyzed by adhering to the stump and abdominal incision.

I explain all this by the fact that the exposure of the peritoneum to air, the handling of the viscera, the production of raw surfaces, and the leaving of dead matter, such as bloody oozing or debris, are followed by intestinal adhesions in from twelve to thirty six hours. If the intestinal coils have been displaced these adhesions produce more or less intestinal paralysis and sometimes complete obstruction.

Many gynecologists, recognizing the fact that improvement follows the free passage of flatus per rectum, try to move the bowels during the second twenty-four hours. Others give stimulating enemata as necessary to relieve gas pains. Others give salines to prevent peritonitis by depleting the peritoneal vessels and thus draining the peritoneum. But these efforts are either begun too late or not employed with systematic

thoroughness, and do not with any regularity prevent deaths of the kind under consideration.

Believing that my observation might be correct, I resolved to test it by a systematic treatment, both before and after difficult operations, directed to the prevention of adhesions of the bowels in the unnatural position in which they may have been left.

Accordingly the day before a peritoneal section the patient is dieted and purged sufficiently to reduce the gaseous distention of the intestinal coils, to the end that they may be kept out of the way during the operation. In vaginal sections, and in abdominal sections for large tumors, the intestines are not so liable to be in the way as in abdominal sections upon small pelvic growths or .diseased organs. In the latter class of cases I try to produce six or eight large stools the day before the operation is performed. Patients of relaxed fibre receive full doses of strychnin from the time I see them. Two hours before the time set for the operation a mild but efficient cathartic is given, such as two teaspoonfuls of the fluid extract of cascara.

As soon as the patient awakes from the anesthetic, a drachm of sulphate of magnesia in an ounce of water, or an equivalent dose of some mineral water, or an ounce and a half of the liquid citrate of magnesia is given every hour and repeated immediately whenever vomited. About six hours after the operation is completed a stimulating enema is given, consisting usually of two ounces of glycerine and four of water, or from half to a drachm of inspissated oxgall in half of a pint of water (without glycerine) is thrown into the upper rectum, and repeated every two or three hours until flatus passes freely between enemas. When this occurs the saline is also stopped, but not until then. In trying to start the passage of gas most surgeons think it enough if gas and feces come with

the enema. But this is not sufficient. The treatment must be continued until flatus passes freely between enemas, and if it ceases to pass occasionally after the enemas have been discontinued then another should be given.

If the operation has been a simple one I commence the salines and enemas a little later, not to prevent bad results, but because the patient is usually very uncomfortable until flatus passes freely, and is nearly always perfectly comfortable after it. It enables me to do without morphine. On the other hand, if raw intestinal surfaces are left after a difficult operation I sometimes give a high glycerine enema before the patient is taken from the operating table.

As presumptive proof of the value of this treatment I have recently had 105 consecutive recoveries after peritoneal sections, and I commenced to be thus thorough and prompt in its administration about the time this series commenced.

I do not claim that it will prevent deaths, for deaths may be due to sepsis, embolus and conditions not connected with intestinal paralysis or obstruction, but my many happy experiences with serious cases that threatened to take the old course have convinced me that my mortality from this cause will never go back to what it was before.

I do not claim to have discovered a new treatment, but rather to have developed and systematized an imperfectly recognized one, and to have demonstrated its value.

DISCUSSION.

DR. EMORY LANPHEAR, St. Louis, Mo., (by invitation): *Mr. President*—I cannot let the opportunity pass without congratulating Dr. Byford upon the remarkable series of 105 cases of abdominal section without a death. It is remarkable even in these days of low mortalities. From the experience I have had of late in this method of treatment, which varies practically very little from the method by Dr. Byford, administering an ounce of sulphate of magnesia just before the patient goes upon the table, I am satisfied that the method pursued

has something to do with the good results. I am sure that my mortality rate has been less ; my anxiety for the after-treatment of the patient has been far less since I have adopted this measure. I have only one point to add in the way of a suggestion to the paper which has been presented, and this is, I have found that when a patient does not respond to the saline treatment, the administration of one-tenth of a grain of elaterin, the active principle of elaterium, given every two hours—heroic treatment—but sometimes necessary, will do much in producing peristalsis, and I believe save the life of the patient. I am sure, that in two or three instances I would have had death had it not been for the salutary effect of the one-tenth grain doses of elaterin.

OPERATIVE TREATMENT OF CARCINOMA UTERI.

BY FRANKLIN H. MARTIN, M. D., CHICAGO.

The uterus, from its structure, the course of its lymphatic vessels, its clinical behavior under infection by carcinoma, must be divided into three parts: the vaginal, the cervical, and the fundal.

The vaginal portion is that external portion of the cervix, beginning at the external os and extending to the deflection of the vaginal mucous membrane upon its surface. It is covered with flat-celled pavement epithelium.

The cervical portion extends from the external os to the internal os, or from the pavement epithelium of the external orifice to the beginning of the tubular glands characteristic of the body of the uterus. The portion of the uterus above this plane constitutes the fundus.

Lymphatics: Inasmuch as metastatic extension of carcinoma is almost exclusively through the lymphatics, nothing is more important for us to study in this connection than the direction and distribution of the lymph vessels leaving the uterus, and the whereabouts of the near and remote lymph glands in their course.

From the vaginal portion of the cervix and the upper portion of the vagina, which are often closely involved with carcinoma, the lymph vessels connect with the deep inguinal glands, and through the connective tissue surrounding the upper portion of the vagina and very low in the broad ligament, they connect with the obturator and the external and internal iliac glands at the division of the common iliac artery.

The lymph vessels of the cervical portion of the uterus first pass through glands situated near the cervix, low down in the broad ligament, and then through the internal and external iliac glands.

The lymph vessels from the fundus pass into the upper portion of the broad ligament and finally through the spermatic chain along the fallopian tubes and ovaries to the superior lumbar glands, situated in front of the aorta near the lower border of the kidneys.

According to Williams of London (Lancet, Jan. 1, 1887), who has written a classical article on this subject, in speaking of cancer of the vaginal portion of the uterus: The disease may begin at any point of the vaginal portion of the cervix, covered with stratified epithelium. In eight cases, three had no special form, simply some enlargement of the lips. In one the disease was papillary—possibly, he says, the beginning of cauliflower excrescence. One presented a red tubercular-like surface. One an uneven surface, having a granular appearance. It may be perfectly smooth and look fairly healthy, appearing only a little livid. In all cases examined by Williams the disease was superficial, from 1-6 to ⅓ of an inch in thickness, with one exception, where it was ¾ inch in thickness. The whole vaginal mucous membrane becomes involved before the disease will extend deeply. As a rule it does not extend above into the cervical canal. In six of Williams' cases the canal remained healthy. It extends rather in the direction of the vagina. When it grows like cauliflower it is superficial and enters but a short distance into the cervix. There was no glandular extension in the obturator or the glands of the groin. This variety is more liable to appear during menstrual life, between the age of 40 and 50, rather than later.

The writer can recall three distinct cases of cervical cancer.

The microscopical diagnosis in these cases was "carcinoma," without any reference to the form of cell. The diagnosis of cervical carcinoma was made entirely from the microscopical appearance as shown after removal of the disease. One was a cauliflower growth, involving the whole vaginal portion of the posterior portion of the cervix; the second two flat growths, involving the vaginal cervix, and more or less of the upper portions of the vaginal tubes. None of these extended into the cervix cavity proper. These cases involved only the superficial tissues, although the cauliflower growth appeared like a formidable growth when viewed from the vagina before the operation. In these three cases there could have been no metastatic extension to lymphatic glands, because all have been well after operation performed, six to ten years ago.

I have seen quite a large number of carcinoma, involving the lower portion of the uterus, where the tendency was to involve the vagina, in which I am unable to say now that the disease was limited to the vaginal cervix, but upon which I operated, and after long intervals there has been no recurrence. So much have I been struck by this clinical feature that I have learned to look with satisfaction upon any carcinoma of the uterus which has a tendency to invade the vagina, even though its growth may be extensive.

Cancer of the Cervical Portion, according to Williams, always starts in the glands of the cervix, never originates in the epithelium of the surface, but may begin close to the surface in the glands, or in the deeper portions of the glands. The portion of the cervix the disease may begin in is varied. In 11, in the 24 cases of W., it began in lower portion of cervix. In two, near inner orifice. In two, at two separate centers. In one, on a mucous polypus. Lower half more prone in his cases. Posterior lip oftenest. It is not possible always to distinguish from squamous variety.

FORMS: May form polypus with possible squamous covering. May form papillary growths on the surface which penetrate deeply into wall of cervix, and may look much like head of cauliflower. May begin in small nodule in wall of cervix, or may begin as nodule close to inner surface and gradually involve whole cervix.

THE DIRECTION of the growth is in the direction of the peritoneum tissue. It grows deeply. It rarely extends on the surface beyond the external os. May grow so as to involve a portion of the vaginal tissue. Its tendency is to grow toward the vagina in its deep invasion so as to involve the peri-vaginalis and the vesico-vaginal, and recto vaginal septa, but rarely includes the mucous membrane of the vagina. In regard to cervical lacerations acting as an exciting cause of carcinoma, Williams says he "never saw a cancer attack a lacerated cervix in the tear. The tear is the last part attacked," he says. He arrives at this assertion after carefully examining a large number of specimens with the microscope. This seems to be at variance with the generally accepted idea, but Williams has the advantage over the majority of us because he has personally examined his specimens with the idea of determining this point.

CARCINOMA OF THE FUNDUS occurs much less frequently than that of the cervix. Pichot has collected 44 cases of what he termed cancer of the body of the uterus. Ruge and Veit described 21 cases in which diagnosis was unmistakable. Williams collected 12 cases, of three of which he had satisfactory microscopical evidence.

WILLIAMS DESCRIBES TWO METHODS OF GROWTH: "Diffuse and circumscribed. The diffuse much more common. They assume a polypoidal shape and the uterine wall at their base may be healthy, or they may form sessile tumors and grow in the substance of the uterine wall, projecting into the uterine

cavity like submucous fibroids. The uterus is usually much enlarged. The disease commences in the epithelium of the glands. They are frequently complicated with fibroids."

DIRECTION OF GROWTH. Two directions—surface extension and deep extension. The spread superficially is often stopped at the inner orifice of the uterus and the opening of the fallopian tubes. It *may* pass the os internum and invade the cervix. It *may* invade fallopian tube.

IN SPREADING DEEPLY it involves the muscular wall, and may pass through it, giving rise to inflammatory exudate on the peritoneal surface, and extension with direct involvement of the parts. The lymphatic glands infected are those along the top of the broad ligament and the lumbar glands. This variety almost invariably occurs after the menopause.

I have condensed in these few pages a short review of Williams' lectures, which recorded definite knowledge as a result of accurate microscopical observation, because it coincides with my clinical experience and explains scientifically what I have noted frequently as empirical facts. It has taught me to classify my cases after thorough microscopic analysis, so that my future recorded cases will be of much more value to me and my colleagues than those of the past have been.

Such work will explain why a thorough removal of a proliferating cancerous mass, covering the whole lower portion of the cervix and extending on the vagina, will accomplish a permanent cure. It partially explains why a cancerous condition of the internal cervix, which is almost too small to diagnose, will seldom be cured by any kind of an operation, and then only by the most extensive one. It partially explains why the complete removal of a uterus twice its normal size with carcinoma or a adeno-carcinoma of the uterus will end in a permanent cure, while a cancer of the fundus, which does not unduly enlarge the organ, will have extended too deeply to make a hysterectomy of any avail.

With more of this kind of work our surprises will be fewer. Those of us who have done much uterine cancer work in the past have had much to explain. Our grave prognoses, in what clinically appeared desperate cases, have proved us, to our trusting patients, most fallible ; while the simple appearing case has occasionally driven us to disaster as prophets.

OPERATIVE TREATMENT.

If there were not frequent exceptions to almost every probable outcome of carcinoma of the three portions of the uterus, we could readily arrive at a plan of procedure in each. Unfortunately these exceptions are many.

In the treatment of epithelioma, or the flat-celled cancer of the postio-vaginalis, there would be little justification for removing the whole uterus for the condition if we did not know by experience that such cases, even typical cases, will rarely, but occasionally, be mistaken for cervical carcinoma, and, what is more frequently the case, a cervical carcinoma will be mistaken for a postio-vaginalis cancer. While an uncomplicated, typical, flat-celled, external cervix epithelioma, even involving a large portion of the vaginal wall, might with perfect propriety be treated by high amputation of the cervix, with the uncertainties of perfect diagnoses we are justified only in removing the whole uterus, including the apparently healthy and the apparently diseased.

In treating the typical carcinoma of the true cervix, there can be no question as to the duty of the surgeon. Here we have the variety of disease which works stealthily, but effectually. Frequently before we have symptoms of sufficient moment to attract attention, the disease has gone to the vesico-uterine and recto-uterine tissue, has involved the glands in the broad ligament near the uterus, and already reached the deep inguinal glands. Here the microscope shows carcinoma of the deep tissue of the cervix. There is scarcely anything

by which a diagnosis by inspection can be made. The woman has lost flesh in an unaccountable way. There is a slight irregularity in her menstruation. There have been one or more slight gushes of blood between menstruations. Occasionally there is the so-called cachexia, caused from septic absorption from bacterial infection of the necrosing cervix. She is between 40 and 50 years of age.

In such a case heroic measures must be adopted early. No waiting for the preparatory treatment more than the necessary preparations for a capital operation. Here we must remove the uterus, and, as far as possible, the infected glands. It is in these cases that experience in operating counts for more than anywhere else in the abdomen. Any one of intelligence, with a knowledge of the principles of surgery, can haggle away a uterus—can do a vaginal hysterectomy, if there is not much the matter with the uterus—and have a living patient pull through in the end. It takes experience in abdominal surgery, however, in pelvic manipulations, which years of work only can impart, in order to give the necessary dexterity to remove the uterus, to remove as much of the broad ligament as it is necessary to remove, without also removing or injuring the ureters, to remove the nest of internal iliac glands, situated at the juncture of the division of the internal and external iliac artery, to remove all this, and, at the same time, spare the life of the patient, is, I say, a problem for an experienced abdominal surgeon.

This difficult, but rational, operation, which was proposed by Dr. Emil Ries, of Chicago, is the operation which blazes the work of the future. It will not do for us to say that it is too late to operate on these cases when the iliac glands are involved, because we know it is not too late to operate upon a carcinoma of the breast when the axillary glands are involved. In fact, we know that we should remove the axillary

glands in cancer of the breast, even when we cannot discover that they are involved. Here we should remove these glands when they are not involved in order to break up the one grand highway for metastatic extension from the cervix. Then we should remove them when they are apparently involved, because an apparent involvement may only be an enlargement from septic infection from seat of primary cancer. And we certainly should remove them if they are actually carcinomatous.

This operation involves a thorough preliminary curetment and cleaning of the cervix, a complete abdominal hysterectomy in Trendelenburg position, and the incising of the peritoneum over the deep iliac glands and their removal.

There is but one way of treating carcinoma of the body of the uterus. That is by a vaginal or abdominal hysterectomy. Frequently the uterus is much enlarged and an abdominal hysterectomy, in such a case, is preferable. Fortunately, as we have seen, a carcinoma of the body rarely extends by way of the deep iliac lymph vessels and glands. Fortunately it is less prone than cervical carcinoma to deep extension at all. I have removed several large carcinomatous uteri where the whole muscular wall had been penetrated and where the peritoneal surface had been involved, and after more than two years there has been no return. We must recognize a difference between adeno-carcinoma of the body, with a tendency to excessive proliferation of tissue with papillary tendency, and the carcinoma of the deep epithelium of the body of the uterus. The first, while more showy, is less liable to deep invasion and metastatic extension.

At last we must consider what to do with carcinomatous uteri, in which it is impossible to obtain the probable primary source of the disease, whether cervical, fundal, or vaginal. Cases in which the disease has been neglected; in which it

is impossible to outline the uterus, or to ascertain to what extent it is involved; in which there is extensive necrosis, excessive discharge, great loss of flesh, septic absorption, great pain, and apparently the most hopeless condition generally: these cases should not be abandoned as long as they breathe. Frequently the symptoms are greatly exaggerated because of septic intoxication as a result of bacterial infection of the necrotic tissue. Sepsis, rather than cancer, is primarily killing the woman. Unnecessary blood loss is sapping her vitality instead of extensive involvement of the carcinoma. In fact we cannot say when it is too late. While we are learning rapidly we are ignorance itself when face to face with this desperate problem. For that reason we should never abandon these cases. I have been surprised, and I am sure I am not alone in this experience—I have been surprised, I say, to find cases like the above picture actually get well after a thorough curetment and cauterization of the diseased tissue. I have seen a large number relieved temporarily of their sepsis, of their blood loss, of their stinking discharges, and given an impulse which was little short of miraculous.

The rare cases which were cured by this procedure were undoubtedly epithelioma, involving the vagina and external cervix, with great tendency to proliferation and necrosis, but with little tendency to deep extension. This treatment will always relieve, never do harm, and occasionally a cure will be the surprising outcome.

Let me summarize this rambling paper:

1. A microscopical examination of the tissue of the three portions of the uterus should be made whenever one of the well-known classical symptoms of carcinoma appears.

2. Carcinoma of the vaginal portion of the cervix should be treated by vaginal hysterectomy, including the upper por-

tion of the vagina and as much of the base of the broad ligament as it is possible to include, with the ureters pushed well to the side of the pelvis.

3. Carcinoma of the body of the cervix should be treated by vagino-abdominal hysterectomy, with thorough removal of the broad ligament and the deep iliac glands.

4. Carcinoma of the body of the uterus should be treated by thorough removal of the uterus by vagina or abdomen so as to include the tubes and ovaries. The iliac glands should be removed if involved.

5. Neglected carcinoma should never be abandoned, but should be symptomatically relieved by curetment and cauterization, if the more radical procedure no longer seems practicable with the possible hope of permanent relief in a small percentage of cases.

DISCUSSION.

DR. EMIL RIES, Chicago: *Mr. President*—As Dr. Martin mentioned my name during the reading of his paper, I feel it my duty to say a few words with reference to this subject. I proposed this method of hysterectomy for cancer of the uterus with removal of the lymph glands, after microscopic and macroscopic researches had demonstrated to my satisfaction that the removal of the lymphatics was necessary, and that it was feasible. At the time of recommending it I did not have an opportunity to demonstrate these points, but I have had since then a chance to do so. I operated on these cases and followed them. The first one was carcinoma, apparently limited to the cervix. The uterus was freely movable; appendages apparently normal; lymphatics uninvolved, as appeared at the examination under an anesthetic. I prepared the patient in the usual manner, scraped and cauterized the carcinomatous mass, then performed a laparotomy which lasted almost three hours. I dissected out the ureters from the brim of the pelvis down to the point where they enter the bladder; I dug out the iliac lymphatics with the surrounding connective tissue, and after laying bare the external iliac artery and veins from the point of bifurcation down to Poupart's ligament outside and to the bifurcation of the pelvic branches of the internal iliac artery inwards, I removed the broad ligament flush with the pelvic wall, removing the round ligaments, the sacro-iliac ligaments, and the uterus with a

portion of the vagina. To give you the immediate result, the microscopical examination showed stratified epithelium carcinoma of the cervix, the carcinoma extending up to the cervix, but not reaching the connective tissue of the broad ligament. The lymphatics did not appear to be much enlarged. After a number of examinations of cadavers I knew the normal size of the lymphatic glands around the iliac vessels. Though here they were not larger than they usually are, still they contained nests of stratified epithelium carcinoma. Besides, there was adeno-myoma of both uterine horns and the lymphatic vessels contained columnar epithelial cells which had nothing to do with the vaginal portion. The patient recovered.

THE DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS OF PULMONARY ABSCESS AND GANGRENE, WITH VIEW TO SURGICAL TREATMENT.

BY ROBERT H. BABCOCK, M. D., CHICAGO.

In dealing with the pulmonary diseases to be considered in this paper the surgeon is confronted with the following questions: 1. Is the affection in reality abscess or gangrene of the lung? 2. Can the focus be reached and should it be operated on? 3. Are the pleural surfaces overlying the affected part of the lung adherent? A correct answer to these queries requires fine diagnostic ability at all times, while it not infrequently baffles the diagnostician altogether.

To answer the first query requires a differential diagnosis between abscess and gangrene on the one hand, and on the other, the differentiation of these from the following conditions: An abscess of some adjacent structure, as of the liver, that has ruptured into the lung; an encysted empyema; an echinococcus cyst of the lung; bronchiectasis; fetid bronchitis and pulmonary tuberculosis. I shall not deal with hepatic or other abscess perforating the lung; previous history and symptoms ought ordinarily to guard against mistaking it for an original pulmonary affection.

In attempting to distinguish abscess from gangrene one should not only remember that they have much in common as regards causation and symptomatology, but also that in some cases a sharp dividing line can not be drawn. The recognition of a local lung destruction, gangrenous or other-

wise, depends not alone on physical examination of the chest. Indeed, in some cases this may furnish less information than do the history and symptoms. Thus may be discovered a pyemia, a puerperal septicemia, or some distinct localized infection, which, by throwing light on the etiology, may materially assist in a correct interpretation of the symptoms and physical signs of the chest affection. The patient may be found to have been intemperate and to have just had croupous pneumonia, or a child may have aspirated a foreign body into his lungs, or there may be an erysipelas or quinsy and the like to serve as a probable cause of subsequent pulmonary infection. I recall a man in the Cook County Hospital who died of multiple pulmonary gangrene resulting from an old middle ear abscess that had led to pyelo-phlebitis of the right internal jugular vein.

There are four cardinal symptoms alike of pulmonary abscess and gangrene : pain in the affected lung, dyspnea, cough and fever. These are not distinctive, as they may all be present in purulent pleurisy. It may be said, however, that in pulmonary abscess and gangrene, thoracic pain is likely to be more persistent and severe, since, with the on-coming of effusion the pain of pleurisy often abates, even when it does not cease. Moreover, if the abscess be of embolic origin, it is announced by sudden sharp pain at the seat of the embolus. In hydatid cyst of the lung, on the other hand, pain may be a marked feature. Upon rupture of a pulmonary abscess into a bronchus there is generally agonizing pain, accompanied or followed by violent cough that ushers in the expectoration of pus, but identical phenomena attend the rupture of pus into the lung from a hepatic abscess or from the pleural cavity. With the evacuation of the abscess pain diminishes or ceases.

Dyspnea is a variable symptom, depending on the extent of lung involved and associated pleurisy, and possesses no

characters peculiar to this affection. It may be shallow and hurried in consequence of intensification of pain when respiration is slow and deep ; or breathing may be labored and difficult. In brief, this symptom may be said to denote some pulmonary embarrassment, but not its nature or location. Cough is a symptom of great importance, since it likewise points to lung disease, but it possesses no characters pathognomonic of abscess. In general it may be said to be more severe and paroxysmal than that of empyema and phthisis but not of bronchiectasis and gangrene, in which last-named affection it also racks the sufferer intolerably. The fever is that of sepsis, depending in its *minima* and *maxima* upon the kind of micro-organisms concerned in its production. For the most part its extremes are of wider range and its type more irregular than in either of the other affections excepting gangrene, while in bronchiectasis pyrexia may be absent. It is almost needless to remark that accompanying the irregularly intermitting fever are more or less pronounced rigors, sweating and loss of both weight and strength, all of them phenomena of grave constitutional infection.

So long as the abscess contents remain confined within the lung the sputum is of negative value and there is nothing in the symptomatology to denote the character of the inflammatory process occasioning it. So soon, however, as rupture into a bronchus occurs the characters of the expectoration assume the greatest importance. If it be a suppurative pleuritis or an abscess of some adjacent structure that has broken through into the lung, the sputum will, except immediately following the rupture, consist of pus without pulmonary tissue ; whereas, if an abscess of the lung has ruptured, elastic fibers and fragments of pulmonary tissue will be mingled with the pus. The color is yellow or yellowish-green and there is generally no odor.

If the condition be gangrene and not abscess, the characters of the expectoration are very striking and different. Its most impressive feature is its almost unendurable fetor, alike distressing to patient and attendants. This may be of an indescribably sweetish character or it may be that of decomposing blood, or mingled with the stench of putridity is a fecal odor. It is most intense during the act of coughing, although the patient's breath is contaminated by it at all times, as is the atmosphere of the sick-room. The sputum has a dirty gray or brownish or brownish-green color and when allowed to settle in a glass divides into three layers. The uppermost consists of froth of the characteristic hue and contains mucus ; the middle one is serous, transparent and albuminous ; while the bottom layer, thick, greenish-brown, contains masses which horribly fetid consist of shreds of pulmonary tissue. According to Leube, elastic fibers are only present when the sphacelated parenchyma has been expectorated before the peptic ferment, shown to be present by Filehne and others, has had time to dissolve them. But even when elastic tissue is absent the microscope detects fibers having the characteristic alveolar arrangement. In addition, this bottom layer contains disintegrated blood cells, oil drops, hematoidin crystals, pigment granules, crystals of the triple phosphates and the various fatty acids, Dittrich's plugs, leptothrix and numerous micro-organisms.

A reliable diagnosis of pulmonary gangrene can only be made by a microscopic examination of the sputa, since a similar fetor of the breath may be detected in cases of bronchiectasis and fetid bronchitis. Even in these affections shreds of lung tissue may appear in the sputa when under the influence of decomposition of the retained secretions the bronchial walls soften and break down and the adjacent parenchyma becomes a prey to the necrotic process. In such instances a differen-

tial diagnosis is extremely difficult, if not impossible, and one must be guided largely by the history and duration of the malady. It might well be in such cases that the patient's emaciation and prostration would not have reached so extreme a degree as would exist had his ailment been gangrene from the start.

From the foregoing, it is seen that so long as expectoration is wanting the symptomatology of abscess and gangrene is practically the same (except that the latter often runs a much more rapid course) and that it is often impossible to establish the diagnosis, prior to rupture and discharge through the bronchi. Some etiologic factor, as pyemia or the aspiration of a foreign body, may render the existence of one or the other disease likely and suggest which of the two it is, but the character of the sputum alone can determine the diagnosis.

Although the physical signs are of great importance and should never be neglected, they can not be relied on to clear up the diagnosis before the establishment of expectoration. These are the following: Dullness over a circumscribed area of variable size, provided the seat of lesion is not deeply situated, is single and large enough to alter the percussion note. If a cavity becomes established and other conditions are favorable the note is tympanitic. Upon auscultation the breath sounds are found to be bronchial, or, if the area has broken down but not yet ruptured and evacuated, they will be suppressed, while the transmission of vocal fremitus is correspondingly altered. Râles over the affected area are usually wanting during this period. Should the focus be sub-pleural, the auscultatory phenomena of fibrinous pleuritis are likely to be added. If croupous pneumonia has preceded, there will have been signs of this affection.

It is now necessary to consider the diagnosis of cavity, inasmuch as the surgeon in dealing with abscess or gangrene

has to be familiar with the means of determining when it has formed. To this end percussion is chiefly to be relied on, yet certain conditions are indispensable if percussion is to avail anything: 1, the vomica must have attained a sufficient size, at least that of a walnut; 2. solidified lung tissue must supervene between it and the surface percussed; 3, the cavity walls must possess sufficient resistance and smoothness to reflect the vibrations communicated to them; 4, the waves of air produced must have sufficient amplitude to produce the overtones essential to tympany.

If these conditions be fulfilled, percussion over a cavity will elicit tympanitic resonance, the pitch of which depends upon the length and number of the vibrations within the cavity. But other conditions than a vomica can give rise to this kind of resonance, as for instance, when cracked-pot resonance is produced by strong percussion of a child's chest in case of bronchitis. Wintrich suggested as diagnostic the change of pitch observed under favorable circumstances when the patient closed his mouth during the act of percussion. That is, when the vomica communicates freely with a bronchus, the pitch of the percussion note is perceptibly higher with the mouth open than with it shut. This, however, is not absolute and therefore Gerhardt's change of pitch was proposed as a diagnostic test. This consists of an alteration of pitch depending on the patient's position; if the cavity be longer in one direction than another and it contains fluid, change the patient's position, as from the recumbent to the erect or *vice versa*, will, through gravitation of the contents to the bottom of the vomica, correspondingly elevate the pitch of the percussion note. Either the Wintrich or the Gerhardt change of pitch is ordinarily proof enough of the presence of a cavity, but if the diagnostician is still captious, he may seek for the so-called interrupted Wintrich change of pitch. That is, when with the

mouth open a rise of pitch in the percussion note is detected only in a certain position, as the recumbent, but not in the sitting posture. An elevation of the pitch during slow inspiration over that during expiration is also a sign of cavity, but of all of these none is held to be pathognomonic except the interrupted Wintrich change of pitch. In addition to the foregoing is that peculiar quality of note known as cavernous and amphoric, which must have been heard to be recognized, since it can not be described.

Upon auscultation of a vomica there may be heard bronchial, cavernous or amphoric breathing, which does not require more than mention. Likewise, there are the cavernous or amphoric voice and certain râles. Of these last the most significant are the gurgles or bubbling râles heard during inspiration, and the metallic tinkle of Lænnec. A conjunction of two or more of the signs just mentioned may, in a given case, establish a diagnosis, although none of them be pathognomonic.

Finally, a differential diagnosis must be made in this early stage between a suppurative inflammation of the lung and circumscribed empyema. To this end the previous history and symptoms must largely contribute, owing to the similarity of the physical signs. The problem is rendered still more difficult by the following considerations: Abscess is a relatively frequent result of lobar pneumonia, while circumscribed pyothorax is often found complicating this form of pneumonia. The pneumococcus gives rise to a pleuritic exudate rich in fibrin and hence it becomes readily encysted. It is generally circumscribed within the confines of the lobe affected with the pneumonia, sometimes occupying the whole, but more often a part of this area, and through the failure of the dull patch to clear up after the crisis it may give rise to the belief that resolution has not taken place. Should this col-

lection of pus, circumscribed under great pressure, at length break through into a bronchus, it is very apt to be mistaken for abscess. It should be remembered, however, that pulmonary abscess generally occasions far greater constitutional disturbance; fever is higher and more distinctly septic; rigors are more pronounced and perspirations more intense; the patient's strength and weight decline more rapidly, and, what is more important, local pain and cough are usually more severe. Pus produced within the pleural cavity by the pneumococcus is rather benign in character and unless mixed with strepto- or staphylococci, occasions only symptoms of mild infection. When, however, admixture with pyogenic organisms takes place, the pus becomes correspondingly more virulent and septic phenomena proportionately greater.

The importance of the information derived through physical exploration of the chest will depend upon the amount and depth of the exudate. If this be sufficient to threaten rupture, there is likely to be more or less evidence of pressure. Careful inspection and palpation will detect slight filling or smoothing out of the intercostal spaces over the affected area, and the side is apt to show slight elevation of the ribs, thus giving a little more rotundity to that part of the thorax. If the exudate compress the lung to an appreciable degree, the apex beat will generally be displaced, although accurate observation is often required for its determination. In my experience, an exudate of this kind is rarely massive enough to occasion appreciable displacement of the liver. Particularly careful study of the pectoral fremitus, and of the breath sounds, as recommended by Potain, will often furnish valuable differential information. I have repeatedly detected feeble vibration, extending into the distinctly dull zone, and being absent only over the very center of dullness, seeming thus to indicate a gradual increase in depth of the exudate from periphery to

center. Such would not be the case in abscess and gangrene, for pectoral fremitus is usually exaggerated over the affected focus, during the inflammatory stage, and after evacuation, but absent after the lung substance has broken down, and before evacuation. In empyema, upon percussion, dullness is generally found to shade off gradually into resonance, the transition being less abrupt than in abscess. Upon auscultation the breath sounds may be either inaudible or, in case the exudate be not too deep, enfeebled and bronchial. In some instances, I have detected a vague friction sound about the edge of the dull patch, while in others it has been rather an indefinite impression of a rubbing of rough surfaces rather than actual friction sounds.

Should the pent-up pus of empyema at length find exit through the bronchi, the event may be correctly interpreted by examination of the sputum, which as already stated does not contain elastic tissue except at the very beginning of or soon after the onset of the perforation. The physical signs will then become those of a cavity, and if the case be then seen for the first time, a differential diagnosis may be extremely difficult or impossible. The percussion note is tympanitic, and the respiratory sounds tubular or even amphoric, and moist râles or perhaps metallic tinkling may be heard. The loud and whispered voice-sounds should be carefully studied, for, unless the communication with the air-passages be very free, they would hardly be such as are heard over vomicæ of such dimensions. In the event of a failure of differential diagnosis, and the amelioration of symptoms that ensues renders surgical interference unnecessary, the subsequent history will probably clear up the doubt. In case of empyema, convalescence is more rapid and steady.

The differential diagnosis between pulmonary abscess and tuberculosis with formation of vomicæ is easy, although it

must be borne in mind, as stated by Leube, that the seat of suppuration following pneumonia is most frequently the upper lobe. In consumption generally the history and symptoms indicate a chronic disease, but it should be a case of acute pneumonic phthisis, with rapidly forming cavity, the detection of tubercle bacilli in the sputum, together with disintegrating lung tissue, will settle the diagnosis.

One of the most difficult tasks is to differentiate between pulmonary abscess and bronchiectasis, or in some instances between gangrene and bronchiectasis with fetid bronchitis. Here again, as always, the anamnesis is of the utmost importance, pointing in the one case to an acute, while in the other to a chronic malady. Moreover, only very exceptionally are elastic tissue fibers, having an alveolar arrangement, present in the expectoration of bronchial dilatation, and when these do occur, the case has been converted into one of abscess to all intents and purposes, and may be treated as such. Not often does bronchiectasis present conditions favorable for diagnosis in respect to determining its operability. Its existence may be strongly suspected from history and symptoms, such as chronicity of the malady, the violent, spasmodic cough and thick muco-purulent sputum that is sometimes most readily expelled in certain positions and does not contain pulmonary tissue, etc., but it may be quite another matter to accurately locate the cavity, and to state whether more than one exists. As a rule, bronchiectases are multiple, and surgeons of experience like Dodlee assert that operative interference is successful only when a single, large sized dilatation exists at the base of the lung. In such a case, the physical signs are those of a cavity from any other cause, and have already been considered. A very significant sign of bronchiectasis is the detection of tympanitic resonance over a circumscribed area which prior to cough and expectoration presented dullness,

and where bronchial breathing then replaces former absence of respiratory sounds.

The only disease remaining, from which pulmonary abscess must be differentiated, is echinococcus cyst of the lung. Pain in the affected side, sometimes very intense, severe and spasmodic cough and prostration are also present. Dullness does or does not exist only as the cyst is superficial or deep seated. In the latter event, there may sometimes be heard distant, numerous crackling râles over a considerable area. If suppuration be set up roundabout the cyst, sepsis may supervene and abscess be still more closely simulated. The one diagnostic feature is the expectoration of a thin, serous fluid containing the charateristic rolled up membranes, or hooklets. Morillou states that the diagnosis is confirmed, even before this pathognomonic expectoration, by the appearance of urticaria during the course of this obscure affection. Fortunately hydatid cysts are very rare in this country.

Supposing that abscess or gangrene, either before or after cavity formation, has been satisfactorily determined to be present, the question arises, is the condition operable? This depends on its etiology and location. If it be pyemic in origin, operation will probably prove of but little avail since other foci than that operated on may be scattered through the lungs. On the other hand, the abscesses most amenable to surgical treatment are those resulting from pneumonia, and in general, also, they are the most readily diagnosed. Unfortunately, experience has shown that even when a pus cavity has been located by physical signs, the operator may have much difficulty in reaching it with the exploring needle. This is said to be owing to the fact that a cavity usually lies higher than is supposed.

Lastly arises the query, whether or not the pleural surfaces overlying the affected part be adherent? If the seat of pul-

monary inflammation be directly underneath the pleura, or if in the course of the disease pleuritic friction sounds have been detected in said area, then adhesion of the pleura may be strongly suspected. But more than this can not be affirmed in the present state of our knowledge.

I will now briefly describe a few cases that illustrate some of the difficulties encountered in the diagnosis of the affections under discussion:

CASE I. In the very beginning of my practice I attended a young woman with pneumonia of the middle lobe of the right lung. After a few days her sputum became very copious, of a brownish red color and of the characteristic odor of decomposing flesh or blood. It was not examined microscopically, but as not many days subsequently a small zone of tympany developed at the lower edge of dullness, I concluded that gangrene had set in. My diagnosis seemed confirmed by the continuance of the fetid sputa, the septic symptoms and above all the gradual spreading of marked tympany, until at length it involved the entire area of original dullness. Convalescence now set in slowly and progressed until the patient was able to get about, although with troublesome cough and considerable purulent expectoration. The middle lobe now presented the following signs: Pronounced tympany, bronchial breathing, that could be plainly heard behind, pectoriloquy, some moist râles, and, more than all, distinct bulging of the intercostal spaces in this area upon coughing. This last seemed to leave no room for doubt of the existence of a cavity. Dr. Christian Fenger concurred in the diagnosis, and a few days later operated by the means of the actual cautery. Two or three days subsequently the patient died, and the necropsy revealed, not a vomica, but multiple racemose bronchiectases throughout the entire area over which signs of a vomica had been erroneously thought to exist.

This showed that the bulging of intercostal spaces during the expiratory pressure of coughing can not, as supposed by the late Austin Flint, be considered diagnostic of cavity.

CASE 2. This was a female patient in my service at Cook County Hospital five or six years ago. I made a diagnosis of diaphragmatic empyema at the base of the left lung, following pneumonia. Dr. Holmes operated, but instead of empyema found multiple small abscesses containing a cheesy material, and scattered along the base of the lower lobe from front to back, close to the diaphragm. At the time he looked upon these as tubercular, but I now conjecture that they were multiple abscesses, such as sometimes form in the course of broncho-pneumonia. The patient made an uneventful recovery.

CASE 3. Some years ago I was asked to see an elderly man who had passed through a recent croupous pneumonia, which was thought not to have resolved, but to have resulted in an abscess that had ruptured into a bronchus. He had had a low septic fever with harassing dry cough, and the day before my visit had suddenly begun to cough up pus.

Signs of a cavity had appeared at the right base, below the scapula. After careful examination of the chest and due consideration of the previous history and symptoms, I made a diagnosis of an encysted empyema, which had broken through into the lung, and advised operative interference. This was carried out, and in so doing the correctness of my diagnosis was determined.

CASE 4. Not far from that time, I saw another man, who had just passed through a lobar pneumonia that was thought not to have properly resolved, but to have resulted in abscess. A mild septic temperature persisted, with troublesome cough, and a zone of dullness over which breath sounds were absent, remained at the right base, behind. I diagnosed encysted

empyema and advised an operation, which was done. Upon the surgeon's having entered the pleural sac slightly too far to one side, and having failed to find pus, he introduced his finger and felt the abscess wall, which seemed to him to bulge from the surface of the lung into the pleural cavity. He thereupon passed his instrument along his finger as a guide, and opened the supposed abscess from a little below and anteriorly. As he did so, air escaped with the pus. Therefore he naturally concluded that my diagnosis was an error. Fortunately, however, I had requested to have a specimen of the pus obtained brought to me, and microscopic examination of this specimen showed an entire absence of pulmonary tissue. Obviously there was but one conclusion, that the lung had been perforated simultaneously with the penetration of the empyema. Both these last patients made a satisfactory recovery.

Case 5. About a year ago Dr. Bayard Holmes asked me to see an elderly man who complained of pain in his left chest, behind, near the region of the kidney. There was a history of an obscure affection that had been diagnosed about a year previously as abscess of the spleen. Two or three months prior to my seeing the patient, Dr. Holmes had made an exploratory incision over the left kidney and found it healthy; at the same time, all the abdominal organs were palpated by laparotomy and found normal. Examination of the lungs disclosed a dull area, with bronchial breathing and faint friction-like râles at the extreme base of the left lung, extending from the vertebral column forward nearly to the posterior axillary line. A positive opinion was not given, but as the patient had a mild pyrexia, I concluded a thin layer of not very infective pus was encysted in the pleural cavity and advised operative measures for the man's relief. Dr. Holmes subsequently reported that he found an aneurysm of the

descending aorta that compressed the base of the lung. The interesting feature of the tumor was, that it did not pulsate and was so firm that it was not recognized until the doctor inserted a hypodermic needle and withdrew blood. The aneurysm had begun to erode the vertebræ. The patient lingered for a few weeks and died of rupture of the aneurysm.

DISCUSSION.

DR. L. L. MCARTHUR, Chicago: *Mr. President*—While the refinements of differential diagnosis between gangrene, circumscribed empyema and echinococcus cyst in this neighborhood are of great value, in practice it still holds true, when surgical interference is indicated, that we can make an exploratory incision into the pleura and, if we find the lung attached to the pleural wall, it is an easy matter with a coil of iodoform gauze to pack off the lung, such a portion as we desire to incise, incise it, drain the abscess, and yet have no general pleurisy follow. I have done this three times in perforation of the right lower lobe, and twice in a perforation of the diaphragm. In other words, we can open such an abscess cavity without the fear of a septic pleuritis resulting. It is difficult, of course, to decide whether the pleura is attached over a given area or not.

DR. BABCOCK, (closing the discussion): I simply wish to add that unfortunately we possess no means of accurately determining whether the pleural surfaces are adherent, unless the history and symptoms lead us to assume that, and what Doctor McArthur has said is true, namely, that the surgeon need not fear infection of the pleural cavity if the surfaces be not adherent; nevertheless, it would, I presume, greatly facilitate the operation if one could in advance determine the condition of the pleura. The question of the accessibility and operability of the disease is an important one for all surgeons of experience, for even when the existence of pulmonary abscess or of gangrene has been determined, it is a difficult thing to locate its position. The exploring needle will often be passed in different directions before the focus can be reached, and, moreover, the nature or the cause of the abscess will determine largely the operability of the case. If it be due to septic emboli in the course of some constitutional affection, as pyemia, or puerperal septicemia, the question of operation is a nice one, because we can never tell whether there is one focus or several foci scattered through the lung. Fortunately this disease is relatively most common after croupous pneumonia, and it is in this affec-

tion that operative interference is justified since the cavity is apt to be but a single one and of large size.

In the differential diagnosis of bronchiectasis from fatty bronchitis, a difficult question arises. We know by experience that bronchiectases are apt to be multiple, and although we may know from the symptoms and physical signs that a cavity is present, it is exceedingly difficult to determine always whether only one cavity exists or several. This was beautifully illustrated in one of my cases which I related, in which there were well marked signs of cavity, and yet the disease was found to be multiple bronchiectases scattered through the middle lobe, which gave characteristic signs of cavity, and yet which was a condition manifestly non-operable.

THE CONSERVATION OF TISSUE AND FUNCTION IN PELVIC SURGERY.

BY HENRY P. NEWMAN, A. M., M. D., CHICAGO.

The aim of medical science in all its branches is conservatism.

The great advancement made in special lines of knowledge and the amount and complexity of investigation which has been carried on have resulted in a division of medicines into so many distinct specialties that the unity of the physical element with which we are concerned is likely to be lost sight of. The pathology of the various organs has been studied too often separately, and as if each existed in the system as a distinct and independent entity, sustaining only a remote and fortuitous relation to the rest of the body. Along this line of thought the tendency developed to follow too closely the old dictum : If thine eye offend thee, pluck it out.

There may be much to be said in favor of the extirapation of offending organs.

It is admitted that the blind, the deaf and the maimed have certain compensatory advantages which render life tolerable. It is certain that when the body is deprived of the use of one or more of the *special senses*, nature sets about a system of refining and perfecting the remaining, so that as little as possible of her original plans shall be disturbed. But this is only an attempt at compensation, and, knowing this well, the specialist for example, on eye and ear, makes all his efforts toward the the one object, the preservation of the function of those organs.

No one needs to be told of the disadvantages of being blind or deaf or maimed in arm or limb, but there is still

much need of instruction as to the advantage of keeping intact the remoter, less commonly familiar structures and organs of the body. The great mass of people in this nineteenth century close on the borders of the twentieth, and late, too, in the history of the art of medicine, are both ignorant and careless of the *significance* of *invalidism* to the individual, the State and the nation.

It is the province of our profession to extend education in this regard, and not more to cure disease than to prevent it.

The conservatism of to-day is not limited to the combating of symptoms. It contemplates, also, the eliminating of the conditions which give rise to symptoms. And this applies particularly to gynecological practice.

The profession in this specialty is not satisfied with a daily routine of practice on lines laid down in the beginning and understood by the laity as constituting the end and aim of the science. The purpose of gynecology is to study into the cause and relations of disease in woman and to bring about a condition of things in regard to woman's life that shall effectually restore to her the health which is hers by virtue of natural endowment, and which is due to mankind by virtue of the prime necessity that woman, the mother, shall be sound and perfect physically.

Now, as to what constitutes a perfect being, physically, there can be no question. Every organ must be intact and in proper relation to every other organ, and every function must be performed with unremitting regularity, and with vigorous activity. Therefore, when any one region is diseased, the balance of health is lost and the disturbance of function is limited only by the susceptibility of the individual and the extent of the disease process.

While this law has been felt, for obvious reasons, as governing diseases of the digestive and circulatory organs, as the

stomach, liver, heart, etc., we are late in giving it its full scope of application in pelvic affections.

We have reached a stage of progress in pelvic surgery, a perfection in technique and aseptic details, that has made it possible to invade this region with impunity and to incise and excise without fear of fatal issue and with confident hope of regional recovery. We have acquired a habit of talking about successful extirpation of the uterus and appendages as if we were satisfied to believe the uterus was a removable, adventitious organ with certain encumbrances destined only to assist in the process of child-birth, and quite dispensable when age or other conditions render this undesirable. Now, we have learned from the teachings of evolution and from the most ordinary observation that nature is accustomed to *rid herself* of all useless structures—that the moment she is done with them they are cast off or disappear.

And we are just on the threshold of one of the greatest illuminations the science of medicine has ever had, light on the obscure and perplexing subject of tissue metabolism, the nutritive relations of every portion of the human economy to every other portion, a relation so fine and intricate that the highest possibilities of microscopy and the most painstaking efforts of chemistry are strained to the utmost to grasp. Research is beginning to show that nature has still a system of laws behind and underneath all we have so far discovered, and that we must learn and apply before we can reach the measure of success we desire in invading her domain.

According to those foreshadowed laws there is not an atom of tissue nor a cell too many or too few in the human frame, and the apportionment of function to each atom and cell is accurate beyond conception. The later developments in the study of body metabolism have opened up a realm into which we have but begun to penetrate, and already proof is piling

up of the intricate and delicate dependence of every structure and function upon every other.

This sort of investigation has given rise to many new theories in regard to internal medicine and to many experiments in therapeutics, of which may be mentioned, the applications of organo-theraphy, the administration of animal extracts, which have reached such vast proportions as to take on considerable commercial importance.

The uses of ovarian and orchitic extracts, thyroid tissues, red-bone marrow, etc., are all founded on the more recent discoveries in systemic nutrition and the demands of general metabolism by which all the different functions are harmonized and the body maintained at a unit of health.

The claim that certain glandular structures, such as the spleen, the thyroid and the pituitary body furnish to the system a secretion necessary to health was the beginning of this work. The ovary is claimed (1) to perform such an important function also. The opinion of many investigators is that the ovaries have the following functions: (2) Ovulation; through the menstrual hemorrhage removing organic toxin from the body; an important part in the general nourishment similar to the use of the testicles in man.

The theory has also been advanced (3) that this secretion is directly concerned in the oxidation of the organic substances containing phosphorus from which the bone-salts are derived.

While many writers still dissent, yet increasing investigation has proved that these speculations are along right lines, and that we have more to consider than mere anatomical possibilities when we interfere with the integrity of physical structures.

A further advanced theory is to the effect that certain of the glands are not more valuable on account of the nutritive secretions which they furnish than for their antitoxic proper-

ties; that they seem in some way to neutralize the action of poisons present in the system and that the evil effects of extirpation depend on the unhindered action of such poisons. If this is found on further study to be true, then the deplored results of the removal of ovaries (4) may be due in many cases to the direct action of toxins which it is the action of the ovaries to eliminate.

That these untoward results of castration, so positively insisted upon by some writers and so vehemently denied by others, are not constant is no argument against the theory of glandular action, for it has been already pointed out that in many cases the spleen, the thyroid and the ovary can be reproduced by the growth of latent portions of similar structures in the body and their vital functions largely carried on by compensatory process.

This is the explanation of the fact that thyroidectomy is not always followed by the grave consequences usually observed. And it may be the explanation of some cases of the persistence of menstruation after ovariectomy. Not that menstruation is to be understood as any function of the ovary. Menstruation being an occurrence of the normal childbearing epoch of civilized woman, whether it was or was not the habit of her aboriginal ancestors (5), is decidedly the index of her genital health, and, so long as the normal relations of her pelvic organs are retained, will persist. Even a small portion of ovarian tissue is so useful that it can maintain this balance —all things being equal—as evidenced by the many cases of menstruation and childbirth in women who have had all but a modicum of ovary removed.

In view of this innovation on our older theories—(that the ovaries can be dispensed with when menstruation and childbirth are not called for, and that the uterus is but an organ for embryonic developement)—it is essential that we should

perfect our methods for the restoration of all pelvic diseased structures and the preservation of their functions.

Doleris (6) says that in over 5000 operations performed in France it is his conviction that in eight-tenths of these, this radical operation could have been avoided; also that out of about 300 cases personally observed in three years he found only about 50 in whom the operation had reasonable grounds. Two or three years ago Howard Kelly (7) claimed that in 200 cases referred to him for operation 15.5 per cent. had no pelvic disease. And Williams (8) of Baltimore asserted that of 300 tubes and ovaries sent to him for examination by five different operators at least 5 per cent. presented absolutely no anatomic justification for their removal.

The operations which have been devised by various operators for preservation of ovarian tissue are summarized in the Am. Year-Book of Med. & Surgery, '96, as follows: 1. After abdominal section, partial extirpation by one of the following methods: (a) Partial resection of the tubes and ovaries, with cutting or tearing of the adhesions, and replacing of the portions so treated within the abdomen; (b) partial amputation of the tubes, with return of the healthy portion to the abdomen; (c) partial resection of the diseased portions of the ovary, the cut edges, if healthy, being brought together and stitched, or ignipuncture of the ovary if cystic, and fixing the ostium of the tube to the ovary; (d) A. Martin's method, consisting also in resection of the diseased portion of the tube, and the formation of a new ostium; (e) salpingotomy—that is, removal of a small piece of the tube, and bringing of the parts together (in cases of hydrosalpinx.) 2. Treatment carried on through the vagina or rectum: (a) Pelvic massage, which, according to Jentzer, need not be discontinued during menstruation, the sittings, however, at that time being of very short duration and the movements being those that oppose

congestion ; (b) dilatation and curettage of the uterus ; (c) catheterization and aspiration of the fallopian tubes for the relief of abscesses ; (d) the special treatment of gonorrheal cases by electricity ; (e) the use of uterine drainage. Having had considerable experience with the first class of procedures, with the exception of ignipuncture, I can speak with confidence as to their efficiency in selected cases.

In many cases coming under my observation there is displacement of uterus and ovaries with adhesions, and chronic metritis, salpingitis and oöphoritis, but no other marked evidences of septic infection.

In these cases the adhesions are broken up, a clean section is made in the ovary of cysts, degenerated follicles and sclerotic tissue.

Accurate coaptation of cut surfaces is secured by fine running catgut suture, the uterus replaced and held in an anteverted position, either by shortening of the round ligaments or the *suspensio-uteri* operation of Kelly, which not only insures a restoration of position for the uterus but prevents ovaries and tubes from becoming adherent as formerly in the cul-de-sac behind the uterus. The uniform success after these procedures depends not more on them than on the accessory work with which I always fortify them. I curette the uterus in all instances and secure a permanent patulous condition of the canal (sometimes by amputation of the cervix), thereby securing free drainage, a healthy endometrium, and marked reduction in weight and size of uterus. Conservation of the ovary is not to be secured by simple plastic section of that organ, leaving behind in the pelvis a uterus faulty in position and function to encourage further progressive or recurrent trouble.

It is such incomplete work which calls very often for the secondary operating we hear so much about.

This technique is modified to suit the requirements of cases, hardly two of which present precisely the same indications. But the general rule is, multiple operating—resection of the ovary, curetting and reposition of the uterus and the establishment of a patulous cervix.

My lack of experience with ignipuncture is due to the fact that theoretically it does not appeal to me as entirely rational, leaving behind, more or less, granulating surface and ultimately cicatricial tissue—effects to be avoided in all plastic surgery.

Treatment carried on through the vagina or rectum without abdominal or vaginal section should be confined to those cases where the inflammatory involvement of tubes and ovaries is in the incipient or congestive stage. In those of long standing, aside from more pronounced adhesion and abscess formation, actual structural changes in the organs present and do not yield so satisfactorily to such treatment from below.

Pelvic massage, while extensively used in foreign clinics and practice, has not become popular in this country and the ethical and temperamental constitution of our American civilization will prevent its wide acceptance, although of undoubted value in proper cases, under proper conditions.

A very large class of cases of pelvic disease which do not call for surgical interference with the integrity of the adnexa are yet greatly benefited by curettage and dilatation of the uterus and canal. This should be accomplished thoroughly and permanent drainage secured either by some mechanical appliance or by plastic operation. I prefer the latter because of the tendency of cervical stenosis to occur, and the prolonged observation and treatment necessary to prevent it unless a more radical procedure is done.

When, however, there are indications which call for the

use of a mechanical permanent dilator, I use a wire coil stem pessary which I have devised and found least objectionable of any such device.

The description of this little instrument may be found in the Am. Gyn. & Obst. Jour., of Aug., '96.

As I have said, however, I prefer to do plastic work upon all such cervices with a view of insuring a patulous canal which will remain so without subsequent treatment.

The technique which I have found most satisfactory in securing this result will be the subject of a paper to be read before the Am. Med. Association at its coming Denver meeting, therefore I will not introduce it here.

In the catheterization and aspiration of tubes for abscess, and in the special treatment of gonorrheal cases by electricity, I have no experience, neither have I any faith.

As for the removal of the uterus when the appendages are hopelessly diseased, this should not be an operation of selection.

When it is found that to leave this organ will complicate the dangers of a grave operation, or when it presents sufficient indications within itself for removal, then the question is settled on its merits ; but when it is simply taken out on the theory that it is of no further use once the ovaries are gone, or that it may become the seat of further disease, we have but made concession to our present ignorance of the value of all tissues and structures in the body's life and maintenance.

To recapitulate: it is the object of this paper to stimulate investigation along the line of greater conservatism of the genital health of women. This may be aided, first, by deeper study into the problems of cell nutrition and general metabolism in order to determine the relative value of glandular and other structures, and the relation of the pelvic organs to the great systemic laws ; second, by seeking into the habits and

regimen of our individual patients as to diet, dress, social and educational life, etc., for the causes of disease, remembering that these, if allowed to go uncorrected, may handicap the best efforts of medical science and effectually undo all that we may accomplish ; and, third, by giving to every definitely diseased structure the best opportunity to recover its function that science can devise, by prophylactic supervision of life and habits, by palliative treatment when it offers relief, and by prompt resort to surgical assistance when it is called for in the interests of true conservatism.

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DISCUSSION.

Dr. Henry T. Byford, Chicago: If the presence of the ovaries are of benefit to the health of the individual, why does nature practically remove them after the change of life? The only explanation is that the functionally active sexual organs are a drain upon the system, which cannot longer be borne without decidedly injurious consequences. In animal life it has been observed that extreme productiveness of a species occurs at the expense of individual development and vigor. When the reproduction is not so great the individuals attain greater physical development. There is no doubt but that the sexual organs in a growing woman stimulate the system to development, enabling her to stand the drain of bringing forth a child and nourishing it. But when once a woman's system is fully developed, every time she bears a child there is a certain drain upon her vitality. The woman who becomes pregnant as often as possible and goes through lactation after lactation soon wears out. Her sexual organs, therefore, are a drain upon her system.

As to the bad results following the removal of the ovaries in women who, by the way, are the only animals who live in a state of constant sexuality, there will be more or less disturbance of the system, the same

as when an athlete ceases exercising and becomes sedentary ; there will be certain functional derangements, but these will subside after a while. Let us take, for example, animals whose ovaries have been removed, and we find the subsequent disturbance therefrom is trifling. In fact, they seem to thrive better. Human beings, however, have a certain set or fixed idea upon this subject, in that they think they are no longer the same as they were before these organs were removed and either imagine or exaggerate many discomforts. I believe that every woman, after having once attained the proper development, would be better off physically if her system were not subject to the strain of the functional activity of her sexual organs.

I seldom remove both ovaries completely in young and middle-aged people. I leave some ovarian structure for generative purposes and to enable a woman to live a married life, but never for the benefit of her health.

Dr. Newman, (closing the discussion): This is a large subject, one much too extensive to bring before the Society when we consider that so many papers are to be read. I must take issue with Dr. Byford as regards the emasculated woman, either artificially or on account of disease, when compared with the mothers of our race. If we choose between emasculated women, the mothers that bore us are far superior to those women that go about sterile through life. We know what they are. They are among the most miserable of their sex. Castration applies equally well to the opposite sex, and I doubt if Dr. Byford or any other member of the Society would be equally liberal in their operative procedures as applied to men.

SACRO-ILIAC DISEASE—TUBERCULAR.

BY L. L. McARTHUR, M. D., CHICAGO.

Synonyms, Sacro-Coxitis, Sacrocoxalgia, Sacrarthrocace.

Since the mechanism of joint and bone infections has been cleared up by the experimental work of the bacteriologist and pathologist, there remains but little divergence of opinion as to the possibility of invasion of any of the body joints by infective elements; the frequency of invasion being almost directly proportional to the activities of, and forces acting in the given joint. Omitting direct macroscopic infective embolism, it has become almost a surgical axiom that there must be two etiological factors in the induction of a joint inflammation.

FIRST—*The infective elements.* Pus microbes, gonococcus, tubercle, rheumatic, staphylicoccus, et id genus omne.

SECOND—*Trauma.* By trauma we are to understand not merely direct or indirect violence alone, (though this is one of the most frequent forms,) but likewise cold, wet, excessive use, pressure and even chemical irritations may determine the localization at any one point of the infective elements.

How? 1, It should now be well known and remembered that when bacteria in moderate number gain access to the circulation, whether artificially or by disease, they are immediately captured, enveloped, swallowed by the leucocytes, except when present in overwhelming numbers, and carried to the liver, spleen and other emunctory organs, where they are slowly disintegrated; the products of this disintegration being stored up in such large quantities as to often multiply many times in size these organs. 2, That this fact is true of

the leucocyte while the leucocyte remains in the blood vessels, it is not killed by such ingestion of micro-organisms. 3 That "Ubi irritatio ibi fluxus" is as true of the *white* as well as the red blood corpuscle. 4, Should this irritation or trauma occur to an organism some of whose leucocytes chanced to be charged with pathogenic bacteria, the determination of leucocytes to the part, some laden with bacteria, follows with certainty. 5, Let the leucocyte, so handicapped however, wander out from the blood current and he dies through the lack of the protective anti-toxin in the flowing blood streams; immediately the contained bacteria begin to reproduce; the inflammatory war is on. More leucocytes called by their chemotactic sense of present toxines, more deaths through lack of protective serum, more exudate. This, true in the case of pus microbes, holds similarly true with our other common pathogenic organisms.

With this understanding of the mechanism of infection of a joint, we can easily conceive how processes so common in the great joints of the body, exposed as they are to so many forms of trauma, may with diminished frequency occur in those less exposed, less mobile, less vascular articulations or semi-joints the sacro-iliacs. We are all familiar with the class room experiment of injecting into the jugular circulation of one of two dogs staphylococcus cultures and then fracturing a femur in each or bruising a knee. The one with the pus microbes will with unerring certainty have a localized suppuration, the other not. Schüller has done the same with tubercle bacilli. Like our Ridlon here, who has by bruising the periosteum over bony surfaces caused an exudate which, in the absence of such bacteria in the blood, induced only a plastic periostitis, for the purpose of building up a condyle, beware lest he try the experiment on one in whom some suppurative process is going on elsewhere, for he may then have an

unenviable experience in localizing infections. Since it is the specific organism which determines the infection, and the trauma the localization, it is as conceivable that we may have a tubercular, a suppurative, a gonorrheal, a rheumatic or a puerperal infection of the joints in question as well as those of other parts of the body; the relative frequency being determined by the active or passive parts played in the motion of the body. While it is true that these joints differ somewhat anatomically from the others, the better anatomists agree as to the presence of both a 1, synovial membrane, 2, cartilage, 3, ligaments and 4, a smooth articular surface. We are not surprised, therefore, to find in the literature cases described as belonging to each of the quoted types of disease affecting this joint, as they do the other body articulations. I have made this digression for the purpose of showing the fallacy of the position taken by some that on anatomical grounds, those inflammations whose localization depends upon the existence of a synovial membrane cannot occur here, namely gonorrheal, rheumatic, syphilitic, puerperal, synovitis; secondly, because they have never seen any. My aim in selecting this subject for our discussion has not been to present to you a classical resume. This has already been accomplished in a masterly way by Van Hook, who reviews the entire literature to 1889 with fifty-eight well recorded cases, and adds one by himself, but to present what practical points I have gleaned from personal experience with five advanced and a sixth possibly incipient case (all tubercular) as well as to recall your attention to a disease which must be thought of in making a diagnosis in every suspected hip joint disease, sciatic or low lying Pott's, and which once seeing will probably remain indelibly fixed in memory.

For purpose of refreshing the memory of the anatomy I pass around the bones constituting this joint when the smooth

auricular surface of the ilium attracts attention, and the roughened larger area for the attachment of the strongest ligament in the body. The pelvis being held in the position it occupies when erect shows that the anterior is really, in life, the inferior surface and the converse for the posterior. The proximity of the 1st, 2d and 3d sacral nerves, of the sacral canal, the internal iliac vessels and the rectum in front once recalled will make clear many of the symptoms, render plain the sequellæ and suggest the surgical treatment. Occurring in all periods of life, Velpeau shows that 37½ per cent. occur between 20 and 25 years, 22 per cent. below 15 years, and before 5 and after 60 very rarely.

Symptoms. Chauvel believes cavalry officers most frequently affected. Males much oftener than females. Erichsen from a clinical study considers chief symptoms as—1, pain ; 2, lameness ; 3, changed attitude and length ; 4, tumefaction ; 5, abscess.

Pain. Consider the joint, its functions, its relations and it is easily understood that pain will be an early, persistent and prominent symptom. Like any other joint, pain will be in the immediate neighborhood, in lower lumbar regions, in buttocks ; and, since the sacral nerves, the obturator and genito crural, anterior crural nerves pass in close relation to the joints anteriorly, any irritation to their trunks will be referred to their terminal distribution, hence the anterior and posterior thigh areas are complained of, the knee and the external genitals. It will be increased by supporting the weight of the trunk, hence felt either standing or sitting ; made worse by jarring in that position, relieved by lying on back, but worse by lying on affected side.

The surgeon takes advantage of this knowledge as one of his chief aids to diagnosis by mechanically driving the two joint's surfaces together by counter pressure over the ilia when

the most constant symptom of pain is made manifest. Pain is sometimes wholly absent on pressure over the joint posteriorly, probably in the early cases of affections involving only the anterior portion of joint.

The rectum lying in front of inflamed joint will attract patient's attention by pain with constipated bowel movement, just prior to evacuation by pressure on anterior joint; *i. e.*, as the fecal mass passes the bulging made by the inflammatory pelvic exudate. This was a prominent symptom in cases 2 and 4, and suggests the immense importance of a rectal exploration in every case of doubtful hip, iliac or sciatic disease.

Posture. Intuitively the patient shifts the weight of the body to the opposite side, as Sayre thinks to make extension by weight of leg, takes short steps to avoid motion at this joint, sets the heel and toe down flat on the affected side, and through efforts to fixate somewhat the sacro-iliac joint may adduct or abduct limb to an extent sufficient to make an *apparent* shortening or lengthening, which may misdirect one's thoughts to the hip joint unless on guard, through the knowledge that this may be likewise induced by sacro-iliac disease. By a similar effect on the pelvic veins to that occuring in milk leg, or pelvic neoplasm, we may have a marked œdema of lower extremity. The lack of use of the muscles here in the efforts of the patient to prevent pain, soon induces an atrophy of that side, the gluteal region may become flattened, and limping is always present. The persistence of the tilting of the pelvis may induce a lateral compensatory curvature above.

Tuberculosis of other joints occurs in one of two ways: 1, Primary synovial tuberculosis; 2, bone tuberculosis and extension to joint; never beginning in the other joint structures, and this holds equally true of the joint under consideration. Therefore, when we have the synovial invasion first we see what has been called the "moist" variety of Velpeau,

and when extension by the rarifying osteitis tuberculosa to the joint, the "dry" or granulating variety. Now as the synovial portion of the articulation lies at the anterior, or—if we consider the erect posture—the inferior quadrant, it is easily seen how the larger proportion of cases have their cold abscess appear intra-pelvic, the point of greatest dependence where they may burrow in the several manners hereafter mentioned. 1, Forward into rectum, 2, outward along pyriformis and sacral plexus behind great trochanter, 3, downward along rectum to ischio-rectal fossa, 4, forward and outward along psoas beneath Poupart's ligament, 5, upward over crest of ilium.

In a certain proportion of cases a fluctuating tumor forms over the posterior aspect of joint first, and may open directly backwards, or burrow up along erector spinæ to lumbar region. More frequently this tumor is secondary to the anterior abscess formation and only betokens the spreading of the disease. All but one of the cases to be presented came to me through the hospitals, and therefore were not seen in the very early stage of the disease and I cannot, therefore, add any testimony to the statements made by the authorities that in the very early stages of the disease there is usually to be found a thickening and tumefaction over the dorsal line of the joint; but should think this necessarily true, *at least in those* which later show posteriorly their cold abscesses.

Methods of Opening. When the abscess empties into the rectum, (often the first objective symptom noted), the patient calls attention to the purulent discharge, and often is soon seized with the classic symptoms of sepsis: *chill, fever and sweating*, as a result of the mixed infection of the tubercular abscess cavity by the intestinal bacteria, and then first calls the physician! Such a sequence followed, too, the spontaneous or surgical opening of such abscess prior to very

recent years, for in the absence of the strictest antiseptic technique a mixed infection takes place similar to that which formerly occurred in opening the psoas abscess. Thus, therefore, inducing the pre-antiseptic surgeons to avoid opening, or when opening resort to the valvular opening with the vain hope of preventing any air or other external vicious elements from gaining access. Ridlon, in writing on this subject, takes the unique position that, in this situation, the abscess is to be opened, while in the psoas it is not.

Every ischio-rectal abscess, especially when of the cold or painless variety, should be carefully examined prior to its opening in order to detect its possible sacro-iliac origin. If of such origin in my opinion it would be better to first excise the joint and drain posteriorly before a mixed infection occurs ; unavoidable with an opening near the anal margin.

With the abscesses opened spontaneously or surgically and fistulæ established, whether near trochanter, under Poupart's ligament, or behind the joint, the direction taken by the probe will be *toward* the sacro-iliac junction, *away* from the hip joint and though it fail to touch denuded bone, will lead so near to it as to justify the suspicion of the disease at that location. In some cases of mixed infection the spinal canal has been invaded, thus Ashurst has seen a fatal case by an extension to the sacral canal and cord, as has also Sutterthwaite.

Localized elevation of temperature over joint has been recommended by Holmes and utilized by Sayre as a diagnostic aid. When next an opportunity offers I shall endeavor to demonstrate the rarifying osteitis by the X-ray photograph and localize the same, thus gaining information both as to extent and position of focus.

Stedman has arranged a convenient differential diagnosis table as follows :

DIAGNOSIS. (STEDMAN.)

1. Sacro-iliac disease rare.	1. Hip joint disease common.	1. Potts' disease not common so low down.
2. Hip motions free.	2. Restricted.	2. Free, except when psoas is contracted.
3. Young adult males.	3. Childhood both sexes.	3. Not rare in adults.
4. Spine not rigid, though often held stiff.	4. Spine freely movable.	4. Spine rigid.
5. Limb apparently elongated and not infrequently adducted.	5. Character varies.	5. Thigh flexed.
6. Characteristic position.	6. No characteristic position; varies.	6. When vert. destroyed, forward inclination of body.
7. Cautious passive movement at hip painless.	7. All painful.	7. Painless.
8. Pain usually localized, but may, etc.	8. In hip, knee or thigh.	8. Pain in back.
9. When sinus, probe goes direction sacro-iliac joint.	9. To joint of hip.	9. Probing no aid, as seeks distant outlets.

Sciatica, usually in much older people, no characteristic position, no deformity except slight flexion. No reflex muscular spasm. Gant says the anterior sup. spine of affected side lower than opposite. "Prognosis (Ashurst) generally fatal" —though slow.

TREATMENT. Having never seen any positive cases in the very early stages of the disease, I have had no experience with the 1, rest; 2, extension; 3, Benj. Lee girdle around pelvis for limiting motion at joint; 4, the Hutchinson high shoe on well foot with crutches and lead sole on affected side, but would theoretically prefer that *rest* of the joint, however obtained, which would permit the moving about of the patient, in preference to steady confinement in bed with [antero-posterior leverage hip] splints. In the present light of bacteriology we have abandoned the external cauterizations and moxæ of olden times and see nothing of it, but I would not therefore presume to deny their occasional efficacy, their acute inflammation, congestions, perhaps acting as does a severe trauma. It is a matter of common experience that tubercular joints follow much more frequently the mild than the severe injuries. The intelligent surgeon will of course do what is possible toward rendering the constitutional condition normal and in the

absence of extension of the process to the tissues external to the joint, would be justified in trying the simpler lines of treatment. When, however, an abscess exists, I believe it of the utmost importance to the patient to have it opened "secundem artem"; never here "allowing nature to take its course" since whether it opens in the rectum or opens spontaneously externally, there comes the dreaded mixed infection which in the past led the surgeons to take so gloomy a view of any operative interference, and furnished statistics of thirty-eight abscess cases and only three recoveries. (Van Hook.) We now appreciate the danger to be a pus infection and with reasonable care can avoid the dangers of the same if case be seen early enough. Even having once started, we can many times check the process by pompt radical measures. The dearth of any systematic plans of attacking this joint when one comes to search the literature is most surprising, some of quite recent date failing to refer to surgery at all (Stedman). Van Hook has offered the most practically systematic plan dependent upon the location of the abscess. If posterior, incise over joint; if anterior, chisel away the posterior infer. spine of ilium and reach the anterior surface of joint by following through the artificial notch. Study of the joint led me to approach the articular surface from without, after loosening the gluteal attachments with periosteum, by chiseling away an auricular fragment corresponding in approximate size to the joint within, directly through the ilium. The localization of this area is particularly easy; if we take the posterior margin of the great sciatic notch as the guide and beginning posteriorly chip off piece after piece to the depth of the joint, we can soon expose the whole auricular surface, and then as much more as may be found by the softened condition of the tissues to be necessary, while we gain at the same time access to any abscess lying anterior to the joint and can prop-

erly drain it. At first blush one might think such an incision would result in the disintegration of the pelvic ring, but if we remember that the strongest ligaments of the body hold these structures in contact, and that the articular surface is designed more for permission of motion than for supporting weight, and that clinical experience shows that radical removal of the diseased structures does *not* cripple while it does cure what heretofore has been considered a tedious but hopeless ailment, we need not hesitate to act. Terillon has twice trephined the ilium for drainage of pelvic abscess over necrotic bone. In speaking on this subject König states that Fischer & Rinnee have trephined for drainage, but it does not appear clear whether he means at the joint or through the ilium. He has done so himself. With the articulated pelvis in hand it will be seen that this method I have recommended enables us to expose the whole joint, if necessary, enables us to reach the anterior surface without injuring important structures, while the supra articular route of Van Hook does not even then comprehend any access to bony joint. All that one can glean from literature, with the exception mentioned, is that the abscesses were opened and the joint curetted, but this is not as easliy accomplished as written, and I believe I have described the only practicable plan of safe approach to the joint.

Case 1. Child, aged 12, patient Michael Reese Hospital. Pre-existing lumbar curvature, Potts', entered hospital with an abscess anterior and posterior to the sacro-iliac joint. Opening posterior abscess showed fœcal complication, and exploration showed complete perforation of sacro-iliac joint. Patient hectic with general amyloid degeneration. Death after six weeks.

Case 2. P. W., aged 15, referred to me by Dr. Ernst Schmidt. Abscess over crest of ilium communicating with abscess anterior to the joint. Exploration of exterior abscess

confirmed diagnosis of sacro-iliac disease. Curetting of joint and draining of abscess permitted boy to return home with small fistulas tract discharging small quantity posteriorly. Death six weeks after return home. Uremic convulsions, general amyloid disease.

CASE 3. L. Y., aged 15, referred by Dr. Frank Billings. Had had operation of curettment of joint at age of 13. Wound required fourteen months in healing. Second attack, abscess anterior to joint burst into rectum. First noticed pain at stool, then strong septic fever. Posterior abscess was tympanitic. Contents offensive, fever 104. Operation, curettment and chiseling out of diseased bone. Wound eighteen months in healing. Weight before operation, 87; at present, 122.

CASE 4. Boy, aged 18. Small size, Jewish. Michael Reese Hospital, September, 1897. Thinks caused by driving for some months a delivery wagon. Six months prior to admission began to have pain in knee and thigh. Then became lame. Four months after onset of symptoms went to County Hospital. Here an incision for suspected ischio rectal abscess made. No result. Then large pelvic abscess drained by incision through rectum. Fever then severe. Did not improve. Later came to Michael Reese. Tumor again to be felt over right iliac joint anteriorly. Slight temperature. Operation of chiseling away an ear-shaped mass of bone, exposing sacro-iliac joint. Discharged improved but not completely healed, with instructions for dressings to be made at Dispensary.

CASE 5. Male, adult, aged 32. St. Luke's Hospital. Tumor posterior to joint with sinus leading to lower segment of joint. Chiseling and curetting operation, packing, with recovery.

CASE 6. Referred to me by Dr. Ridlon for early operation. No tumefaction. Pain indistinct, classical and negative. Some lateral curvature. Advised the constricting fixation girdle.

DISCUSSION.

DR. WELLER VAN HOOK, Chicago: *Mr. President*—Dr. McArthur is to be congratulated upon having seen so many cases of sacro-iliac tuberculosis. It is a comparatively rare disease. The points he refers to in differential diagnosis are valuable, and should be borne in mind in the future when these cases come up for study. I will only add a word or two with reference to the mode of attack in this form of disease. I do not think Dr. McArthur quoted me quite correctly in his paper. The idea is to chisel away sufficient amount of bone from the posterior to the superior iliac process to enable the operator to reach the site of the disease. But my idea was, in attacking the joint in this way, not to do a typical operation, but an atypical one, adjusting the amount of excision in each instance to the amount of disease present in the individual case.

I regret very much we have not time enough to hear all of Dr. McArthur's paper. Five or six cases of this disease is a rather unusual experience occuring in the practice of one surgeon, and it will tend to throw more or less light on the pathology, symptomatology and treatment of the disease.

DR. D. W. GRAHAM, Chicago: I do not think sacro-iliac tuberculosis is as rare a disease as the author of the paper would have us believe, from my own experience and from what I have observed in the practice of others. In this particular, I was fortunate in having as one of my teachers Professor Sayre, who made this disease a prominent feature in his course of lectures each winter. He also lectured a good deal on the differential diagnosis between sacro-iliac and hip-joint disease. Personally, I think the diagnosis is frequently overlooked, and my experience has been that many of these cases are treated for months for sciatica. I recall a case at this time that was treated for a couple of months for sciatica, it being the case of a young woman. I finally put her in the horizontal position in bed, and had her kept there for one year. She improved rapidly. This was some twelve years ago. She is perfectly well to-day. The diagnosis in this case was confirmed by two other physicians at the time.

Another mistake is made in diagnosis in not considering hip disease in the early stage. I have no doubt many cases are treated for hip disease and get well. I have seen some cases that were treated for a long time for hip disease, where a diagnosis was ultimately made of sacro-iliac disease. I am sure many cases, not severe in character, are treated throughout the whole course until well, and are still counted hip-joint disease. I do not believe sacro-iliac disease is as rare as the two speakers would lead us to believe.

DR. ALEX. C. WIENER, Chicago: I wish to make a few remarks on the early diagnosis of sacro-iliac tuberculosis. In the few cases I have seen I have noticed the peculiar gait characteristic of this affection, which, when once seen, can never be mistaken. The sacro-iliac joint should be kept immobilized as much as possible.

As to early means of diagnosis, I think we have a valuable aid in the Röentgen Ray, and with it I have made an early diagnosis in one case.

With reference to operative interference, I would say that as soon as an abscess has formed, whether it be due to a mixed infection or not, it should be opened. This is Brun's treatment in this disease. Under any circumstances, an abscess in this region is to be opened and evacuated. In some cases by immobilization and permanent extension of the joint or limb, perfect resorption may be induced without surgical interference,

DR. MCARTHUR (closing the discussion): I have very little to add in my closing remarks. I do not think I misquoted Dr. Van Hook relative to his method of operating. I took pains to state in my paper that he had offered the most practical, systematic plan for attacking this disease, depending upon the location of the abscess. If posterior, incise over the joint; if anterior, chisel away the posterior inferior spine of the ilium and reach the anterior surface of the joint by following through the artificial notch.

In regard to the frequency of this disease, I believe it is an infrequent affection, but one which it is highly important to bear in mind when confronted with hip-joint disease and sciatica. I am sure, one disease is mistaken for the other.

I want to say in regard to the history of the six cases reported, two got well. One of them did not return. One left with a fistulous opening, and two died. Two out of six had a fecal complication, the abscess emptying into the rectum, and of the two that had anterior and posterior abscess, the abscess was tympanitic on percussion, presenting a peculiar condition that we were uncertain as to whether to incise it or not. On incising it, finding fecal matter and pus escaping, the diagnosis became plain of abscess, which had first opened into the rectum, and by mixed infection had become so bad as to extend posteriorly through the joint.

A NEW DEVICE FOR OBTAINING THE URINE SEPARATELY FROM THE TWO KIDNEYS IN EITHER SEX.

BY M. L. HARRIS, M. D., CHICAGO.

In January of this year I had the honor of presenting before the Chicago Medical Society a new instrument for the purpose of collecting the urine separately from the two kidneys. After some months now of clinical experience in its use, I wish again to call the attention of the profession to this instrument. Its use in numerous cases has demonstrated thoroughly its practicability and its efficiency. It will not be necessary to describe in detail the construction of this instrument, as it has already been illustrated and described in the Journal of the American Medical Association, Jan. 29, 1898, and in Medicine, April, 1898. Briefly, however, it consists of two small catheters enclosed in a common sheath throughout their straight portions and revoluble about their longitudinal axis. Each catheter is connected by means of a short piece of rubber tubing with a separate glass vial and each vial with a common exhaust bulb. A suitably curved lever is automatically retained in position by means of a detachable, forked connecting piece and spiral spring. The instrument is used in the following manner : The catheters, in apposition, are introduced into the bladder. The lever is then introduced into the vagina, if a female, or the rectum if a male, and properly fixed by the forked connecting piece. The catheters are now revolved about their longitudinal axis until their inner ends come opposite the openings of the ureters, right and left

respectively. By adjusting the spiral spring in the notches on the under edge of the lever the inner end of the lever is raised so as to form a longitudinal fold or septum in the base of the bladder, extending from the inner orifice of the urethra backwards midway between the ureteral openings. The ureters thus open one on either side of the central longitudinal septum in intimate relation with the inner end of its respective catheter. By a very gentle exhaustion of the air from the vials by means of the bulb, the urine as fast as it escapes from the ends of the ureters is at once taken up by the catheters and passed into the vials, right and left respectively. The instrument amounts practically to a prolongation of the ureters from the bladder to the vials, so that the urine as fast as secreted by the kidneys drops at once into the vials, without that from the two sides becoming intermingled.

The diagnostic value of thus being able to collect the urine separately from the two kidneys is often very great. We are able to determine at once whether the disease be vesical or renal in its location. The urine coming directly from the kidneys is uncontaminated by pathologic products of the lower urinary tracks. If urine appears in both vials we may be certain of the existence of two kidneys, a most important point when the removal of one kidney for any reason is contemplated. Having the urine from each kidney separately we are able by analysis to determine whether both kidneys are diseased or only one, and if but one, which one. We may locate at once the side involved in renal calculus, pyronephrosis, or hydronephrosis, and the source of the blood in hematuria.

If one kidney be diseased, before operating upon it, it is of inestimable value to know the functional capacity of the opposite kidney.

After operating one kidney it has repeatedly been found at the autopsy that the opposite kidney was wanting, or so rudi-

mentary, contracted or diseased, as to possess but little, if any, functional activity. We are now able to avoid such unfortunate occurrences, for by collecting and analyzing the urine from each kidney separately we can determine with accuracy the functional capacity of each. The great importance of this cannot be overestimated. One very important advantage of this instrument is its applicability to either sex. It can be used as easily on the male as on the female. It can be used without an anesthetic as there is little pain attending its application.

In case of an acute cystitis or an hyperesthetic bladder the presence of the instrument within the bladder may excite a tenesmus or spasmodic contraction of the bladder which may be painful.

I have used the instrument in one such case. The tenesmus and pain is easily overcome, however, by the use of cocaine locally. The instrument is not a difficult one to use. Any one possessed of reasonable skill and gentleness in the use of instruments will meet with no difficulties. The most important rule to observe in its use is extreme gentleness. The bladder is a delicate organ and all rude manipulation of instruments within it should be vigorously guarded against. After the instrument is in place and before attaching the vials, it is advisable to always irrigate the bladder with plain sterilized water. The urine does not flow steadily from the ureters but escapes only a few drops at a time at intervals of twenty to forty or more seconds. A common error of those using the instrument for the first time is a too violent use of the exhaust bulb. When the flow has become established by the use of the bulb it will continue itself through siphonage, and only the most gentle use of the bulb is ever necessary or permissable.

Under ordinary circumstances it requires twenty to thirty minutes to secure sufficient urine, hence patience is necessary,

as it cannot be obtained any faster than secreted by the kidneys. The first few drops that come over should always be discarded. By an observance of these simple rules the use of the instrument will be unattended with difficulties and I can assure you from considerable experience that the results will be most gratifying.

DISCUSSION.

DR. JACOB FRANK, Chicago: *Mr. President*—I had under my observation for about six months a case in which I catheterized one ureter by Kelly's method, but somehow I could not catheterize the ureter on the right side. At the time I had Dr. Harris try his instrument on my patient, and after the passage of the instrument it was shown that the right kidney did not secrete any normal urine whatever. An operation was therefore decided upon, the kidney removed, and found completely disorganized. This case was a very instructive one, in that the woman had suffered for fourteen years. She had been treated for bladder difficulty by several physicians. While I thought it was the fault of the kidney, I hesitated to operate because I was unable to find any marked enlargement, and strange to say, she always referred her pain to the other side, and not to the side the diseased kidney was on. In this case it gives me pleasure to say that the device of Dr. Harris was very successfully used.

DR. L. L. MCARTHUR, Chicago : I wish to add my testimony to the efficacy of the instrument Dr. Harris has invented. Since it has been brought before the profession I have had occasion to use it in two cases in which the diagnosis would have been extremely difficult without it. One was a male patient, who had been having hematuria for two years, but there were absolutely no subjective symptoms. The man discoverd that he had hematuria by urinating on the snow. A few blood casts had been found, but as to which side the trouble might be on we were still in the dark. In the hands of Dr. Harris the case resolved itself very speedily into one where the urine was found loaded with blood, albumen, and a few blood casts from the opposite side. In one bottle there was absolutely normal urine, while in the other there was bloody urine.

A second case was one in which there was a large tumor on the right side reaching over beyond the left rectus, so that it was difficult to decide whether it was a cystic gall bladder of enormous size or a cystic kidney. The urine did not reveal any abnormal condition microscopically nor chemically. With the Harris instrument, however, not a drop of

urine came from the right side, while normal urine was obtained from the other side, so that we had no hesitation in making an incision for cystic kidney instead of cystic gall bladder and confirmed the diagnosis. The instrument is ingenious, easy of application, and thoroughly scientific in its construction.

DR. A. E. HALSTEAD, Chicago: I had occasion to use Dr. Harris' instrument last week in a case of stone in the kidney, and it worked very satisfactorily indeed. With its aid a diagnosis was readily made of stone in one kidney. We found no difficulty whatever in using the instrument. I can testify to the ease with which it may be employed, and the perfect confidence that one may place in the results of the examination by the use of this instrument.

DR. HENRY P. NEWMAN, Chicago: I wish to report a case which was diagnosticated as sarcoma, but the immediate organ involved could not be determined accurately until the Harris instrument was used. The resemblance to sarcoma was identical with that of a prolapsed or displaced kidney, which is frequently quite confusing, but by means of the instrument we were able to exclude kidney trouble, and operated and removed the sarcoma of the omentum.

THE TREATMENT OF ACUTE ABSCESS AND GANGRENE OF THE LUNG.

BY A. E. HALSTEAD, M. D., CHICAGO.

It is only within the last few years that well known surgical principles have been applied to intra-thoracic suppurative conditions. Although Hippocrates first performed pneumotomy it was not until 1873 when Mosler opened a pulmonary cavity that work in this line was placed upon a scientific basis. Surgeons before this time, notably Baglivi (1696), Barry (1727) and Richter (1805) had advised incision and drainage of pneumonic cavities and a few had operated successfully without recognizing at the time the exact nature of the disease. Mosler's operation though unsuccessful was speedily followed by others many of which unfortunately terminated fatally. Later experimental work on the lung and its surgical treatment as well as the published observations of its practical application to diseased conditions made principally by Glück (1881), Block (1882), Schmidt, Biondi and Bull (1884) firmly establish a rational basis for the treatment of suppurative diseases of the lung.

In this paper the term abscess of the lung is employed to designate only acute suppurative inflammation, non-gangrenous, which has its seat wholly within the lung tissue, therefore cavities filled with pus formed either by a dilated bronchial tube or by destruction of lung tissue from tubercular infection will not be considered.

Pathologic anatomists and clinicians agree on the extreme rarity of acute pulmonary abscess. In the literature we find

many cases reported as abscess which undoubtedly were empyemata of the ordinary type that had ruptured into the bronchi or interlobar suppurative pleurisies which were encysted and which only rarely can be differentiated from suppuration within the parenchyma of the lung.

The most frequent cause of acute abscess of the lung is lobar pneumonia. In former years abscess was considered a frequent termination of pneumonia but we now know that this is only rarely the case and then only when the palient's resistance is greatly impaired either from prolonged illness or from old age. Pneumonia was the cause of the abscess in 23 of the 49 cases collected by Tuffier.

Next in frequency to pneumonia we have pyæmia as the cause of lung abscess. This may occur in any case of septic infection but most often is the result of puerperal infection.

Foreign bodies in the bronchi and penetrating wounds of the chest are occasionally the origin of pulmonary abscess. Suppurations in neighboring organs especially sub-diaphragmatic abscess and pyo-nephrosis may extend to or break into the lung and cause all the symptoms and be equally as dangerous as primary abscesses. Infection of an hydatid cyst is an exceedingly rare cause of abscess.

A pulmonary abscess may be of any size from that of a millet seed to one containing a quart or more of pus. They may be single or multiple, superficial or deep. Those that follow lobar pneumonia are usually single when large enough to be recognized by physical signs. In pyæmia abscesses are frequently multiple which renders the prognosis extremely unfavorable.

Any part of the lungs may be the seat of an abscess. Taking all varieties into consideration about 80 per cent. are found in the lower lobes.

Gangrene of the lung may arise under many different con-

ditions, chief among which may be mentioned traumatisms to the chest such as extensive crushing injuries and penetrating wounds; compression of the main artery of the lung by a new growth; obstruction of a main bronchus by a foreign body with subsequent infection of the lung; extension from a cavity containing fœtid pus as occurs in bronchiectasis and from embolism of the pulmonary artery. It may also occur after lobar pneumonia in patients debilitated from any cause.

The frequency with which gangrene follows pneumonia is still undecided. Andral found 52 in 583 post-mortem examinations in cases of pneumonia while Huss found only 12 in 2166 cases. As in abscess anything that greatly reduces the patient's general health will favor gangrene after pneumonia.

Gangrene of the lung may be diffuse or circumscribed, cortical or deep. From a surgical standpoint diffuse gangrene is not to be considered, as no operative treatment is possible.

The medical treatment of abscess and gangrene of the lung does not deserve consideration. Outside of the ordinary tonic remedies no internal medication can have any influence on the course of the disease. We must admit that recovery without operation is possible and that a small abscess may be completely emptied into a bronchus and the cavity heal. But a large abscess or one of sufficient size to be recognized clinically practically never heals without surgical intervention. The prognosis in gangrene is nearly as unfavorable; fully 75 per cent. terminate fatally if left to themselves.

We must therefore regard both of these conditions as amenable only to surgical treatment and endeavor to save these patients by a prompt operative treatment, rather than allow them to die slowly of septic absorption or suddenly, as is frequently the case, by suffocation from pus breaking into the bronchi, while we are waiting for spontaneous recovery.

The surgical treatment of abscess comprehends puncture of the abscess and aspiration and incision of the lung and drainage. Puncture should only be employed for diagnostic purposes and never as a curative measure. In abscess of the lung as in empyema, aspiration as a substitute for incision and drainage, should never be considered. In abscess it is not only ineffective but at times is followed by purulent pleurisy, which greatly diminishes the chances of recovery. In gangrene, before liquifaction of the necrose tissue takes place, pneumotomy can alone be considered. In both gangrene and abscess it is the operation of choice and should always be attempted as soon as the diagnosis of either of these diseases has been made.

Quincke considers that in acute abscess pneumotomy should only be performed when there is great danger to life. Most surgeons agree with Terrier that an early operation, particularly in acute abscess, is strongly to be recommended, before a thick wall of connective tissue forms around the abscess and prevents collapse of the walls of the abscess after evacuation of the pus, and thus prolongs the time required in healing.

The technique of operation of pneumotomy for abscess or gangrene varies according to the exigences of the individual case. The skin incision usually employed is similar to the one used in Estlander's operation, that is—a curved incision with the convexity downwards. A musculo-cutaneous flap is reflected sufficiently to expose the ribs selected for resection. The number and extent of the ribs resected depends upon the size and location of the abscess. Ordinarily, resection of from one to four ribs will be required. In abscess of long standing a more extensive resection of the chest wall is necessary than where the abscess is of recent origin. In any case an opening in the chest wall should be made large enough to allow careful inspection of the pleura.

Tuffier, after resection of the ribs, separates the parietal pleura from the under surface of the ribs and intercostal muscles. He then introduces his hand underneath the thoracic wall and outside of the parietal pleura, and carefully palpates the whole lung and determines the location and extent of the lesion.

He claims that resection of one rib allows him to separate the parietal pleura from the chest wall over an area as large as a man's hand. This procedure has proven difficult or impossible in the hands of other surgeons and has not been generally adopted. The pleura is easily torn and hard to detach, especially posterior to the angles of the ribs.

At this stage of the operation it is of supreme importance to determine the existence or absence of pleuritic adhesions. Most surgeons regard the absence of adhesions as a contraindication to the immediate completion of the operation. Two ways of determining the absence of adhesions are employed: First, by the introduction of an exploring needle into the lung, which will oscillate with each respiratory movement when no adhesions exist; second, direct inspection through the parietal pleura, which allows the operator to see the movements of a non-adherent lung. Both of these methods are at times misleading. The exploring needle may oscillate even when there are adhesions, providing they are not very firm. Again, in many cases the parietal pleura is so thick that the movements of the lungs cannot be seen through it although no adhesions exist.

Having determined after reaching the pleura that adhesions are absent, Quincke provokes a fibrinous pleurisy by the application to the parietal pleura of a paste of the chloride of zinc or of gauze saturated in a solution of the same substance. After five or six days, when the adhesions are firm, the operation is completed. The presence of this pleurisy is determined by the physical signs and by the pain that it causes.

Neuber after reaching the pleura tampons the wound with iodoform gauze and then completes the operation from seven to nine days later, when adhesions are usually firm.

DeCerenville causes adhesions by introducing daily for some time before the operation a needle deeply into the lung. This method is objectionable because of the frequency with which purulent pleurisy results from infection by the needle.

In the absence of pleuritic adhesions, Roux unites the two pleural surfaces by a suture around the periphery of the induration which marks the seat of the lesion in the lung. He then completes the operation at that time, depending upon the sutures to prevent infection of the pleuræ. Other surgeons, after uniting the pluræ by suture, complete the operation some days later, after ahesions have formed. My observations, based on experimental work on dogs, coincide with those of Quenu, who considers suturing of the parietal to the visceral pleura without opening the pleural cavity as an extremely difficult operation, especially when the surface of the lung and visceral pleura are in a relatively normal condition, as is usually the case when no pleuritic adhesions exist. Again, it must be remembered that in the absence of infection, suture of the two pleural surfaces does not cause firm adhesions.

In the cases where no union of the pleural surfaces exists and where there is no great danger in waiting a few days, the safest course to pursue is to incise the parietal pleura sufficiently to allow the introduction of one finger, carefully explore the whole surface of the lung and locate the lesion. The finger should prevent a large quantity of air from entering the pleural cavity at once and thus allow the lung to collapse gradually and avoid the profound shock which rapid collapse of the lung and the introduction of a large amount of cold air will cause. The part of the lung, the seat of the lesion,

should be drawn into the opening and fastened to the parietal pleura by suture after the method of Roux. If the lesion should be found at some distance from the opening in the pleura another incision should be made immediately over it and the first closed by suture. After waiting for from three to five days for adhesions to form the abscess may be opened with safety.

In cases where the symptoms are so urgent that no delay is permissible, the lung is incised immediately after it is sutured to the parietal pleura.

When operating on cases where no adhesions exist, it is of the utmost importance that the temperature of the air admitted to the pleural cavity should as nearly as possible approach that of the blood. At the same time, as before stated, the air should be allowed to enter gradually so that respiration will not be seriously embarassed from too rapid collapse of the lung.

In the cases where pleuritic adhesions are firm, which fortunately are by far the most common, the dangers of pneumotomy for abscess or gangrene are not nearly so great. After the parietal pleura has been reached it will usually be found greatly thickened and opaque. An aspirating needle should now be introduced and the lesion located.

The abscess is then opened by following along the needle with a scalpel or with the knife of the Paquelin cautery. When the abscess is old and the wall surrounded by a thick layer of fibrous tissue the scalpel can be used with safety. In recent abscesses where the danger of hemorrhage is greater the incision should be made with a cautery knife. After the cavity has been opened adequate drainage should be provided for by the introduction of a large rubber drainage tube. Care should be taken to prevent undue pressure upon any part of the abscess wall by the tube which might cause erosion of a blood vessel with fatal secondary hemorrhage.

Curettage of the walls of the abscess cavity has been advised but should never be practiced because of the great danger of hemorrhage.

After pneumotomy for gangrene, removal of the sequestrum by means of a currette, might be advised under certain conditions, but on the whole it is safer to pack the cavity with gauze, which should be allowed to remain for five or six days.

The results of pneumotomy for acute abscess and gangrene up to the present time are on the whole encouraging. Unfortunately the lung is frequently the seat of multiple abscesses or the disease is bilateral which accounts for a considerable number of the deaths. The recognition of either of multiple abscesses or bilateral disease of the lung contra-indicates any operative treatment. Many cases succumb because the nature of the disease is not determined until the patient is far advanced in amyloid disease or is so greatly reduced from general sepsis that recovery is impossible.

Réclus in 1895 collected twenty-three cases of abscess from various causes which were operated upon between the years 1885 and 1895 with twenty recoveries and three deaths. Tuffier's collection (1897) of forty-seven cases of abscess, forty-three of which were treated by incision, gives thirty-three recoveries and ten deaths. In three, death occurred during or immediately after the operation. In seven of the forty-seven cases, death was the result of failure to locate the abscess and was apparently not hastened by the operation.

In Morillin's collection (1897) the results are equally as good, giving thirty-eight recoveries after forty-nine operations.

In gangrene the results of operative treatment are even more favorable than in abscess, when we consider the gravity of the disease. In Tuffier's collection of seventy-four cases, seventy-two of which were treated by pneumotomy there were forty-two recoveries and twenty-nine deaths giving a mortality

of 40 per cent. The most encouraging statistics so far published are those of Reclus, which give eleven recoveries out of thirteen cases operated upon.

DISCUSSION.

DR. JACOB FRANK, Chicago: I wish to relate briefly my experience in reference to surgery of the lung. I have carried out quite a number of experiments on dogs, and have had occasion to operate upon an abscess of the lung in the case of a child. As the Doctor states in his paper, we need to be very careful in opening a pleura which is not adherent to the lung. I found in my experiments on dogs that if I made a small leak before I could introduce my finger the lung would collapse. There would be profound shock produced in the animal, and some of them would die in a few days of pneumonitis. In lung surgery I think that if a patient needs an immediate operation and there are not many adhesions formed to the lung, if it is not done at once the patient will die. I do not think it is wise to begin an operation on these patients when they are already moribund, because the tissues will not resist. There will be re-infection of the healthy tissue that you cut into and the patient will surely die, not from shock but from extension of the pneumonitis. A patient with abscess of the lung, if he has a chance for recovery from the operation, it would be reasonable to make it. If we had some means of producing adhesion of the pleural surfaces to the lung and in a few days afterwards make an incision, in this way it would be more like opening an abscess cavity. I think we can make the same comparison in cases of pelvic inflammation where we may have an abscess which cannot be opened through the vagina or from above and we cannot get adhesions from the peritoneum. What would we do in such a case? We would pack, produce adhesions and several days later make an opening. There is hardly any surgeon who would open an abscess and allow the fluid to enter the abdominal cavity, but he would try to get it out at once. In cases of abscess where there are adhesions to the lung and where the abscess has not already extended to the bronchi, if the patient throws off pus the operation is quite easy. My experience in the surgery of the lung has been similar to that related by Dr. Halstead. In the case of the child which came under my care who had an abscess of the lung, the child coughed the pus out of the lung. It was not really vomited. The child would once a day bring up a half-teacupful of pus. The diagnosis was verified by a colleague, Dr. Preble. During anesthesia pus came out. The operation was made exactly the same as Dr. Halstead has recommended. Some of the ribs were removed where the pleura was adherent. A needle was inserted and pushed in four differ-

ent directions, but no pus could be found anywhere. What was to be done under the circumstances? I finally bored into the lung tissue with my finger and saw a little pus oozing, which in all probability came from the abscess cavity, but we had to give it up. I inserted a drainage tube and closed the wound. It is a formidable thing to tamper with the lung surgically.

DR WILLIAM CATTO, Decatur: I notice that Dr. Frank in speaking of his case said that the child was already emptying pus through the bronchial tubes. My experience is that when an abscess breaks into the bronchial tubes the patient usually recovers in the majority of cases, and I should think the patient would stand at least as good a chance for recovery by spontaneous emptying of the cavity through the bronchi as he would by an operation, and the point which struck me at the time was as to the need of an operation in this case.

DR. FRANK: It was a chronic case, probably of two or three years' standing. There was no improvement or chance of recovery, and hence an operation was performed.

DR. HALSTEAD (closing the discussion): In answer to Dr. Catto as to Dr. Frank's case I would say that statistics show that practically 95 per cent. of all cases of abscess of the lung that are operated upon die. Once in a while an abscess will drain itself through the bronchial tubes. Surgery of the lung is the most discouraging work a man has to deal with.

I think Dr. McArthur made the statement that it was a comparatively easy thing to tampon around a non-adherent lung in opening an abscess the same as in opening an abscess of the liver. If you try to pull a lung down when it is practically in collapse you tear it and you have a profuse hemorrhage, calling for artificial respiration. While the opening of an abscess of the lung is similar to that of opening an abscess of the liver, if any adhesions exist it requires great skill on the part of the surgeon and a good deal of nerve to complete the operation.

DR. FRANK: I would like to ask Dr. Halstead whether any method has been found for producing adhesion of the lung?

DR. HALSTEAD: The only method I know of is the one mentioned, namely, of pulling the lung tissue into the opening and suturing it there. There is the method recommended by Tuffier of preventing collapse of the lung by forced respiration through the bronchial canula. He introduces the canula and by means of a rubber balloon keeps the lungs inflated. This method, of course, is not new, because it has been followed in experimental physiology for years, keeping the lungs inflated while the pleural cavity of the animal is being opened. So far as I know it has never been successfully tried in man.

URINARY FISTULÆ.

BY W. M. CATTO, M. D., DECATUR.

Urinary Fistulæ may be congenital or acquired. The latter is most frequently met, and is nearly always due to violence, more rarely to disease.

They are named according to their situation, and the structures involved. Thus in vesico-abdominal there is communication between the interior of the bladder and the external abdominal surface. This variety is usually due to penetrating wounds, such as gunshot and stab wounds, or to operative wounds that fail to unite, *e. g.* after some cases of cystotomy.

In utero-vesical, cervico-vesical, vesico-vaginal, and urethro-vaginal, the opening connects in the first three instances the urinary bladder with the uterus, cervix, or vagina, and in the last the urethra with the vagina.

Although these fistulæ may be caused by accidental wounds inflicted from without, they are usually the result of ulceration and sloughing, caused by pressure during parturition. More rarely they arise from the presence of neglected stone, or from the ulceration caused by malignant disease. Vesico-rectal fistula, in either sex, probably more often results from malignant ulceration in either the bladder or the rectum than from any other cause.

Urethral fistulæ are ordinarily due either to crushing violence or to stricture of long standing ; more rarely to instrumental manipulation.

Urinary fistulæ are always annoying, often cause serious

impairment of the general health, rarely heal spontaneously, and are sometimes most difficult to cure.

The diagnosis is usually easy, being determined by a lessened flow of urine through the natural tract, its escape through an unnatural channel, and the presence of an opening communicating with the bladder on the one hand, and the skin or mucous surface on the other.

Those that heal spontaneously are usually of small size and of very recent standing, resulting from punctured wounds or from operative wounds. The last mentioned, however, are very uncertain in the length of time required for the healing process to become complete ; this varying from a few days to a few years, and sometimes the wound never heals during the life of the patient.

Most surgeons doing supra-pubic cystotomy learn by experience to apprise their patients of this possible result. To illustrate : A few years since, upon examination of a patient in the usual manner, I concluded that he had an immense stone in the bladder, and accordingly determined upon the high operation. Upon entering the bladder, however, instead of a large calculus, I removed seventy-eight small ones. He had a very much enlarged prostate gland. His recovery was without noticeable incident, but after many weeks, the wound failing to unite entirely, my patient became dissatisfied and consulted a surgeon in Chicago, who he claimed removed another small stone, which I have no reason to doubt; still the wound failed to heal. It is yet open, and I think in this case as in many others of like character, where great prostatic enlargement exists, the fistulous opening acts as a safety valve.

The treatment of urinary fistulæ in all cases is operative, and for this purpose they may be divided into two classes, viz.: 1, those where immediate operation is indicated, and 2, those in which it is best to defer this procedure to a future time.

In the first class we have those fistulæ, no matter where situated, caused by penetrating wounds, and in which there is no, or at most very slight, loss of tissue. All that is needed in these cases is simple perfect coaptation of the edges of the wound with antiseptic sutures.

When, however, there is any considerable loss of tissue, due to inflammatory action or sloughing, it is usually best to wait until the inflammation has entirely subsided and the general health of the patient has improved.

Although each case operated may require variation of the details, in a general way the indications are the same in all, viz., cleanse the bladder throughly, render the urine as bland and unirritating as possible, remove all thickened and cicatricial tissue from the margin of the opening, freshen and bevel the edges at the expense of the mucous surface, and close the wound carefully with antiseptic sutures placed close together, and when there is likely to be any traction on the wound insert extra stitches well back to remove the tension.

My preference is for silk-worm-gut of small or medium size; it has the advantage of being easily tied, is unirritating, does not cut nor undergo absorption, and can be left longer with safety than any other non-absorbable suture material.

I desire to briefly report two cases bearing on this subject, one somewhat noteworthy for the manner of its aquisition, the other for the method adopted in its cure.

Case 1 is that of D. R. A German miner, aged 34, who came to me in March, 1896, complaining of inability to urinate without great difficulty and pain. Upon examination I found about midway between the glans and the pubes and completely encircling the penis a mass of hardened, warty tissue, about an inch in width, dark in color and considerably raised above the adjacent parts. This particular tissue was hard and unyielding and felt like gristle.

In my surprise I exclaimed, "what caused that ring?" meaning of course the hard tissue mentioned. The patient asked me how I knew there was a ring on it, and proceeded to explain that when a boy about fourteen years old, one day when at play, some older lads had slipped a finger ring over the organ and he had been unable to remove it.

His modesty prevented him from applying to the proper source for assistance and he allowed it to remain. After a period of more or less suffering, the swollen tissues caused the ring to become buried from sight, and our friend, presumably acting along the same line of argument attributed to the ostrich, concluded that when it disappeared it ceased to exist. He grew to manhood, married, and became the father of four healthy children, but the ring was silently at work all the time, until now the organ presented the above described appearance. Mr. R. was unable to pass more than a few drops of urine at a time, his clothing was constantly wet, he suffered greatly, had chills, and began to show deterioration of his general health; there was slight oozing from the under surface of the urethra, and at this point the urine was leaking. It was impossible to pass the smallest instrument through the strictured portion into the bladder.

Cutting down through the indurated mass, I could feel the ring, which I succeeded in dividing both on the dorsal and under surface of the organ, using for this purpose a forceps with one flat and one cutting blade. This done I managed to extract the ring in two pieces as one might remove a splinter. It was much thinned and weakened, but had lasted long enough to accomplish complete destruction of the urethra where it had encircled the organ.

After the removal of the ring, notwithstanding my instructions for him to return, the patient disappeared from observation for several months, concluding, I presume, that the origi-

nal cause of his trouble being removed, he would get along all right. After a time, however, he returned, when an external urethrotomy was performed. The urethra divided longitudinally at the point of destruction, which was about three-fourths of an inch in extent. A large catheter passed into the bladder and left in situ and the tissues stitched over it at the seat of operation. It was with some difficulty they could be made to meet owing to their altered, non-elastic, cartilaginous condition. Union was not perfect, a small opening being left, resembling a hypospadic condition about midway along the course of the organ. The patient declined to submit to an operation for its closure, declaring himself quite comfortable. His general health is now seemingly perfect, and he claims that he suffers no inconvenience whatever.

CASE 2 is one of vesico-vaginal fistula, mainly interesting because of the large size of the opening, its position and the manner of its closure.

Mrs. S. J., aged 44 years, came to me in September, 1894, with the following history :

She had borne ten children, six of whom were living. Her labors had always been tedious, and some of them difficult, but the last one in July, 1891, was very protracted, finally terminating with instrumental delivery. The child is said to have weighed about fourteen pounds, and had been dead for some days. A few days after this birth she "ceased to pass her water," as she expressed it, and a careful examination revealed the fact that the urine was escaping through an opening of considerable size into the vagina.

At the time she came to me for examination no urine had passed through the urethra for nearly four years, and owing to the continual moisture, with the accompanying odor, together with the irritation caused by the parts being constantly bathed in urine, life had become well nigh unbearable. She

protected herself as well as possible by means of absorbent pads in the vagina, which of course required frequent removal and gave but partial relief.

The operation for closure of the fistula was performed Nov. 18th, 1894, Dr. W. H. Sparling of Moweaqua assisting. It was found that the opening from the bladder into the vagina was large enough to admit the end of the index finger easily, and situated immediately in front of the cervix uteri, there being absolutely no vaginal tissue between the fistula and the cervix ; the anterior lip of which was hard and shrunken, preventing any possibility of making natural closure in the ordinary way, or of obtaining a flap from the cervix. In this extremity I adopted the plan of turning the cervix entirely into the bladder and by excising a ring of mucous membrane from the vaginal wall behind the cervix, proceeded to unite the freshened edges in the usual manner. No extraordinary difficulty was encountered in the operation. Silk-worm gut sutures were employed, and at the end of eight days when they were removed perfect union had resulted, except at one point where a pin-hole leak existed. This was easily remedied a few days later by picking up this point with a small forceps, snipping the mucous membrane with the scissors and passing one stitch. No further trouble was experienced and the urine passed entirely by the natural channel. Menstruation through the bladder continued normal and regular for about a year, then occurred at more irregular intervals owing to the climacteric.

It is interesting to note in this connection that neither pain during menstruation nor any cystitis whatever resulted, and at the present time the patient enjoys perfect health.

For the first two or three months after the operation the precaution was taken to wash out the bladder after menstruation, but this practice was then discontinued.

Lawson Tait in 1879 reports a case where this plan was pursued by Sir James Simpson; also one by J. R. Lane. These, however, were cases of *vesico-cervical* fistulæ, and in the latter instance pregnancy afterwards occurred, a very obvious objection, and at the same time proof that the closure had not been successful.

POINTS IN MINOR SURGERY.

BY A. C. CORR, M. D., CARLINVILLE.

In presenting this paper I shall not presume to present anything new or entirely original, but to suggest a few topics in such a way as to elicit a character of discussion that will help to familiarize us with the best surgical procedure in that variety of surgical matter that constitutes the greater part of our surgical work and a great part of the work of the all-around general practitioner.

I am not opposed to specialism in medicine, but believe the well-informed general practitioner of medicine is the best exponent of the usefulness of the profession of medicine. As Prof. Dr. Samuel D. Gross expressed it in his Centennial paper, published in the American Medical Journal, "he, the well-informed general practitioner, is the only one who can take in the whole situation." I wish also to affirm in this connection no one should presume to restrict his practice except from sheer necessity until he has been a general practitioner for ten years. Indeed, there is so much to say at this juncture that I should feel almost recreant were I not to inveigh against the rapidity in which our professional adherents are running, it seems to me, wild into specialism. There is no need for many of the divisions that are made by some in the practice of medicine. We can scarcely meet a doctor who is not a "specialist" in some narrow line of work. The charlatans, the quacks and the mountebanks have caught the "special" craze, and each one is advertising himself as specialist in

everything. The modest, well-informed general practitioner frequently has it suggested to him by his old patrons, when in some ordinary indisposition, that a specialist had better be called. At the rate we are drifting in this line soon the practice of medicine in its purity will be a specialty adhered to by very few. There is a feature in this craze of specialism that seems remarkable.

There are specialists in operations only. I doubt the propriety of a head that cannot diagnose guiding the hand that operates. It is too common to see physicians introducing themselves as operators who have not practiced long enough to be proficient in diagnosis.

Surgical Operations are susceptible of being divided into typical and atypical cases. The typical cases are those like amputations, operations for vesicle calculi, artificial anus, cataract, enucleation or evisceration of an eye, reductions of dislocations, the readjustment of the fractures of long bones, ovariotomy, etc.

The atypical cases are such as burns, lacerated wounds, compound fractures, conjoined fractures and dislocations, crushed wounds, gunshot wounds. Many of the conditions that complicate obstetrical cases, such as delivering by embryulcia and the delivery of monstrosities, the treatment of ulcers and abscesses, corneal ulcers and foreign bodies in and on the eyes, wounds of the chest complicated with emphysema, pneuma-hydro, or pyo-thorax, etc.

Besides these there are a vast number of both typical and atypical surgical cases that constitute a large part of the practice of surgery in the ordinary sense of the term.

Since the more perfect understanding of the causes of inflammation and suppurations in surgical conditions and in what asepsis and antisepsis consists many of the old-time capital operations have become minor ones ; hence, while the do-

main of surgery has been widened that of minor surgery has been made to comprehend much more.

SHOCK AND ALLIED CONDITIONS. Shock is sometimes of minor importance, hence may be properly considered here, yet it is sometimes of so grave importance as to be paramount to all else. Every gradation of shock from a condition of little importance to that of extreme gravity may be met with in very ordinary surgical work.

It is remarkable what trivial procedures will produce a condition approaching shock in some persons. I have had robust, well nourished men faint from having the eyelid everted; others from having the ear speculum introduced or the wall of meatus touched with a probe. I have often had patients faint while having the trachomatous bodies on the eyelids compressed, though under the influence of cocaine. I know a refined and intelligent, well nourished gentleman who has often to rise from the barber's chair and walk to prevent fainting during the simple process of being shaved. I think these are not instances of true surgical shock, but are illustrative of a condition *allied* to *it*, both in nature and symptomatology, and require much the same treatment in degree. Such as, first, the recumbent or inverted position and some sternutatory stimulants and a preparation of the mind. I have frequently placed the patient horizontal or inverted him till the slight shock would pass off, having him inhale ammonia, camphor, menthol or nitrite of amyl till the circulation is good, and then explaining the cause and the trivial character of the manipulation or operation, and then repeat the process of the operation, just as in the beginning, and complete it without the shock recurring.

The graver forms and degrees of shock are susceptible of being divided into two classes for intelligent treatment—those complicated with hemorrhage and those that are not. Cases

in which there is little or no hemorrhage should be promptly treated with the horizontal position, or be partially or wholly inverted. Sternutatory or Schneiderian stimulants, which by their action on the nasal and bronchial mucous membranes reflexly through the pneumogastric act on the heart, these may be used temporarily till more permanent stimulation of heart and vaso-motor apparatus can be administered through the stomach and by hypodermic injection. In the stomach should be given small amounts of alcohol, diluted arom. spts. of ammonia or sulph. ether. The alcohol should not be kept up long nor given in large quantities, as is often done with the common alcoholic beverages, which, to say the least, is untidy therapeutics, and such use is unsound in principle and unscientific in practice.

If conditions are not soon sufficiently ameliorated, a resort should be had to more efficient and less transient remedies, such as glonoin, digitalis, strychnin and ergot by hypodermic method.

If there is severe shock it is of little use to fill the stomach with stimulants that act only after absorption, for the stomach and intestines will absorb little or nothing for want of that varying condition of vascular tonus so necessary to absorption yet always wanting in shock, and the interposition of two sets of capillaries through which such remedies must pass before they reach the brain or heart. I refer to the capillaries in the mucous surface of the stomach and intestines, and those in the liver substance. While all absorption is delayed in such condition, it is much more readily achieved from the cellular tissue where the capillaries of the liver do not interfere between it and the heart and general circulation. Perfect quietude, and, where the patient is conscious, cheerfulness should be maintained during necessary treatment. In the more grave cases of shock complicated with hemorrhage, there

should be added to these measures effusion of warm normal salt solution into the circulation, and if the abdominal cavity is open there is probably no medication that equals the effusion of warm, almost hot water into and among the stomach and intestines. This acts with unmistakable force as a vascular, heart and nerve stimulant that can be readily appreciated, —I said if the abdominal cavity is open. I will put it stronger and risk your criticism. It should be introduced into the stomach through a recurrent stomach tube. If that does not suffice, through a recurrent trocar into the abdominal cavity, or the abdominal cavity should be opened for the purpose. Bandaging the limbs from the extremity towards the body, where the volume of the blood is diminished by hemorrhage, so as to keep the more vital nerve centers supplied with the resquisite blood, would be a rational procedure where the infusion of the normal salt solution is impracticable.

In the treatment of lacerated and incised wounds, in view of the more recent discoveries of the causes of surgical fever and suppuration, there is very much less to be desired. Antiseptic surgery means, primarily, clean surgery. Every cut or lacerated wound, whether resulting from a surgical procedure or accident, where there is no contra indication for its being closed and which does not sufficiently co-aptate itself, should be closed by adhesive straps or sutures, or both, with this provision, that its surface should be thoroughly cleansed; if there is no other indication, with a normal salt solution.

The stitches should be of aseptic cat-gut, if intended to go in tissues below the skin, and all put in place ready to tie; then the wound thoroughly washed—I mean with detergent force with a solution of sodium chloride in the proportion of a teaspoon full to the pint of sterilized water—then the parts well co-aptated by tying the sutures and knots cut close and the surface dried fairly well, then dusted with iodoform, and

coated with collodion, and if practicable well padded with gauze and cotton, and bandaged and left so for a week, if some adverse condition does not arise, when it should be examined by removal of all dressing and treated as required.

If the wound is deep and the tissues disposed to draw apart while the skin can readily be closed over, the stitches may be entered near the edges of the skin and the deep tissues siezed with a forceps or a tenaculum and drawn forward so the needles take a deeper hold back farther, and brought out near the edge of the skin on the opposite side, so that when the stitches are tied they will draw the otherwise gaping deep tissues together as well as the skin. (If nerves or tendons are divided they should be stitched with antiseptic absorbable sutures separately.) The deep tissues may be closed by absorbable stitch material, leaving the skin to be closed over these stitches with silk sutures separately. In such cases the outside dressing must be modified so as to admit of the skin sutures being removed in from three to five days.

In performing the plastic operation on the eye lids, styled the "Hotz operation," or some of its modifications for entropion, the use of absorbable sutures has proved a great advantage over silk stitches, the removal of which on the third or fifth day endangers the new union of tissues. The incision after stitching is sealed up with iodoform and collodion and no bandage is required, and the patients go about their business in the meantime much more comfortable than before.

It is well known that there is an almost distinct variety of streptococcus that infests the hair follicles and sebaceous glands of the skin that can not be easily removed by washing, and these the needle may carry into the deeper tissues if all are stitched together. Separate stitches would obviate this. Indeed, in some operations involving certain points, it would be better to stitch each distinct tissue separately, if possible.

I think the better practice in closing deep wounds with sutures would be to stitch the deeper parts first with aseptic absorbable sutures and then suture the skin over it. This would obviate the liability to poisoning of the deeper parts with the more possible skin stitch infection.

Stitch Infection. On removing the dressing, if it should be found that the tissues are but imperfectly united and in and around each stitch in the skin is a quantity of pus, ichor or saneous material and the margins red, the wound should be treated to the most thorough disinfection, not only antiseptic washes and fluids, but disinfectants and germicides should be used.

The adjacent skin should be most thoroughly washed with surgical soap, then with ether, followed by alcohol; after which a very fine pointed pipet or syringe should be filled with solution of peroxide of hydrogen and the same injected into each stitch perforation and also from one to another, making it run out of the holes freely until all possible infection and its products are neutralized and removed. This should be followed by dilute alcohol and by ether in the same way, and then solution of sodium-chloride.

Then if necessary re-stitch with better material than before and seal up with dressing as in primary operation. Treat as required subsequently.

Burns. I do not know how to treat burns of first and second degree so as to prevent the very severe and long continued burning pain that is experienced, other than to keep a continual stream or application of cool water on the parts. I hope some of you have discovered a more convenient and efficient method, so that it may through this channel go on record and into the literature of the profession.

The restoration of a comparatively non-contracting skin in burns of the third degree is now entirely possible by the pro-

cess of skin-grafting. The Thiersch method is well adapted, and the only suggestion I have to offer is that in order to get sufficient grafts when large areas are to be covered, is that they may be taken from pigs, dogs, cats and Guinea pigs; the skin of the animal first being shaved and thoroughly washed, and then grafts taken in the usual way. This was admirably demonstrated by Dr. Ferguson of Chicago, in February last. There are many minor points in the surgical treatment of diseases of and accidents to the eye that might be referred to in this connection. In treating corneal ulcers it is not of most importance that a specific remedy be found for a typical ulcer, or a germicide for a specific microbe, but that the conjunctival and adjacent surfaces be thoroughly cleansed from micro-organisms, infectious material and dirty dirt, and that the ulcers themselves be perfectly cleansed by washing with disinfectants, the white infiltrated margins be scraped and cleansed and all possible micro-organisms destroyed, if needed by cauterization, or other efficient germicide, the whole conditions made aseptic and kept so. In a particular manner must the puncta canaliculi, lachrymal sac, nasal duct and nasal cavity be inspected, for very often it is some diseased and microbic condition of these mucous auxiliary passages that aggravates and perpetuates conjunctival inflammation and ulcerations of the cornea, the importance of which I claim in part the priority of bringing to the attention of the profession.

The conjunctiva is a mucous cul-de-sac, well adapted for gathering micro-organisms and other sources of infection from the air, and cultivating them so as to make them infectious, especially to an inflammatory process already begun, hence the necessity for washing out this cul-de-sac as a prerequisite to the more specific medication, and to frequently repeat it during the course of such treatment as a safe-guard against primary and secondary infection. The ordinary glass pipet

holding only half a dram of solution will not suffice. The dental rubber bulb syringe holding from half to an ounce is well adapted for the purpose. It holds enough to very well wash out one eye with a steady stream which can be directed with accurate aim, and long enough to remove secretions and foreign substances.

Anything short of such a washing out is imperfect and ought not be relied on. It is more from this source that ophthalmia neonatorum is poorly treated in the hands of many physicians than want of strength of the medicine used to control the disease.

Ingrowing toe-nails. I should not feel disposed to introduce this subject in this connection were it not that a very recently published system of surgery, by many authors, does not give a true etiology nor an efficient mode of treatment of this very annoying condition. And that within a short time I saw two well educated physicians, one just out of an accredited medical college and the other a practitioner of wide and long experience, dividing a toe-nail by scraping and splitting near its edge and removing the so-called ingrown portion by pealing it back to the matrix, regarding that procedure sufficient for a radical cure.

The deformity called ingrowing toe-nail is due to a rubbing pressure process, by which the tissues at the sides of the nail are pressed against and up over it, so the tissue becomes permanently hooded up over the sides of the nail and with continued and alternating pressure the tissues become tender and sore, and permanently deformed. *The nail is not deformed and needs no treatment.* The only radical treatment is to remove with the knife or scissors all the hooded tissue that laps up over and onto the nail, and also that well down on the side of the toe back to the angle of the lateral and transverse margins of the nail, and allow the cicatrization to contract and

repress the tissues so there is none that can be hooded up over the nail again.

This minor surgical procedure is best made by entering a narrow bladed scalpel vertically at the proximal angle of the nail on the side between the hooded up tissue and the nail, and keeping it in contact with the nail till it enters the skin below its margin and pass it downward till it emerges from the skin on the side, then cut straight out to the end of the toe along side of the nail, leaving no tissue lapping over the margin of the nail, then cutting the flap off at its proximal end by cutting it back on the side of the toe as far as, but not down to, the matrix. When the surface so made has quit bleeding, a dry dressing with other antiseptic precautions should be applied until cicatrization is complete, when, if the work has been well and thoroughly done, the trouble cannot recur.

Infantile Phymosis. This minor surgical operation in its typical form is called "circumcision," and is performed as a religious rite or ceremony, and usually by a Jewish church officer. Against this practice of course no one would inveigh, nor do I, when done in cases of severe calamities, but against the propriety of performing it indiscriminately for contracted orifice of the prepuce in children, I do protest.

It is unnecessary therefor to mutilate, and results in an anatomical and physiological deformity, by removing the natural covering of the glans-penis, leaving a considerable area of mucous membrane exposed to contact of clothing and other sources of friction and deforms the organ without other adequate compensation. It is perfectly physiological for the prepuce to contract beyond the orifice of the urethra, and though it should contract so as to impede the flow of urine and lead to balooning, it is perfectly susceptible of being stretched to almost any capacity, and even if there is cicatricial

contraction, it is only at the orifice, for which the removal of the whole prepuce is unnecessary. The removal of a small ring, including the contracted portion at the orifice, is sufficient, which will leave the glans physiologically covered.

I am quite confident a little patience and ingenuity in stretching would be better surgery than the mutilation by circumcision for this very much overtreated condition.

Prepuce-otomy. Splitting the prepuce from its orifice back part way, or wholly, to the corona glandis, I presume is much less frequently performed now than formerly. Many years ago the late Lewis A. Sayer, of New York, introduced this operation and gave it a wide importance. He assumed that irritation of the glans-penis by contracted prepucial orifice in children was the cause of most all cases of every partial or complete paretic conditions of lower extremities. Many other nervous phenomena were ascribed to it, such as chorea and epilepsy. He asserted in the face of the neurologists of the country that splitting the prepuce and loosening the incidental adhesions of mucous membrane of the prepuce from that of the glans and the removal of the incidentally retained smegma would cure all these and many more ill-defined neurotic troubles. While the American Neurological Association, composed of such men as Spitzka, Segium, Hammond and our own Jewel, regarded it an error, yet it gained wide reputation, so that almost every small city had its prepuce-otomist.

It proved evanescent and I believe is now seldom practiced. I know some young men who now wear a deformed prepuce as a sacrifice to a false etiological and therapeutic theory as ridiculous as it was barbarous.

While I am on the theme of departed barbarities, I wish to sound the knell of another fad in the practice of medicine and surgery that is now passing. It well illustrates the pertinacity

with which popular errors are transmitted in medicine, or how they are transmitted from book to book. I refer to all the ring and horse-shoe utero-vaginal pessaries and their modifications. With what kind of philosophy anyone could conceive that a displaced uterus with super-imposed abdominal contents, tight abdominal constriction and an habitual faulty posture of the individual as a cause could be held in place by a hard rubber ring or any of its modifications inserted into the vagina, I could never comprehend, and happily to-day nearly all physicians are coming to the same conclusion, and gynecologists are modifying greatly such practice.

DISCUSSION.

DR. J. W. STANDLEY, Alexis: Dr. Corr in his paper asks for some remedy to relieve pain in the first and second degrees. My experience has been that carbolic acid will do it.

As to a remedy for ingrowing toe-nail, it is necessary to have the shoe so made that the foot is kept firm and straight. Do not crowd the toes.

DR. J. E. BEST, Arlington Heights: In answer to Dr. Corr as to something to relieve the pain of a burn, if he will cleanse the part first aseptically with carbolized solution, then follow it with one per cent. picric acid, it will relieve the smarting or burning better than most anything I know of. The part should be covered with gutta percha tissue laid in strips and dressed surgically, protecting it the same as we would any other surgical wound until healing has taken place. This will prevent thickening and contraction of the scars.

DR. E. H. OCHSNER, Chicago: The treatment of superficial burns is a subject of tremendous importance to the physician and one which is not easily solved. If the surface of the body involved by a superficial burn is only slight the treatment mentioned would certainly be very efficacious; but the minute the surface involved is more than one-eighth or one-quarter of an inch the application of poisonous substances, as carbolic acid, campho-phenique and picric acid, is dangerous. We know that even in healthy tissue if we apply carbolic acid we are bound to have very soon involvement of the kidney, and the shock of any burn when one-third or more of the body is involved is so serious that we cannot afford to apply any dressing which adds to the shock, although it may relieve the pain. Ordinarily, even burns covering

one-third of the surface of the body can be treated successfully by applying copious wet dressings consisting of a saturated solution of boric acid. The word saturated is very important. The reason why men fail with boric acid is because they use an unsaturated solution. I have treated quite a number of cases of burns and have had only one case where the pain was not instantly relieved by the application of a saturated solution of boric acid. Boric acid is non-poisonous, a good antiseptic and fulfills all the requirements. A treatment first advised by Lusk, of New York, consists of the application of a mixture of the balsam of Peru and castor oil, one part of the balsam to fifteen parts of castor oil. This makes a remarkably soothing mixture and hastens the healing process.

DR. W. H. COLE, Kewanee: I live in a town where we have manufacturing interests, such as pipe mills, rolling mills, iron foundries, machine foundries, etc. Nearly every week or every day or two some of us physicians are called to treat burns. I treat them with carbolic acid. I have treated them with boric acid and various other remedies. I have watched my cases to see the effects of different remedies, and I must frankly confess that I believe there are idiosyncracies. A few years ago a young man working in one of our mills had his foot and leg badly burned or scalded by steam, the area of the surface involved extending over on to the abdomen. I saw that the two surfaces were too large to apply any active remedy. I at once enveloped him in cotton batting saturated with carron oil. He did well under this treatment. I also resorted to similar treatment in the cases of a boy and girl. In case of burns, to relieve the pain, I give morphine from the start.

DR. E. BOLLES, Macomb: In regard to the matter of ingrowing toe-nail, I have had considerable experience in treating such cases. Dr. Hamilton, of Monmouth, some years ago wrote an article, published in the Medical and Surgical Reporter, of Philadelphia, in which he reported several cases of ingrowing toe-nails treated in the same way as mentioned by Dr. Corr. I have come to the conclusion that the hood over the nail is a fungus growth and I have been in the habit recently of curetting that away. It is a little painful, but under ether anesthesia you can curette it in a short time, and then dress it with carbolic acid.

DR. C. B. HORRELL, Colchester: I have had considerable satisfaction in the treatment of burns from a somewhat ancient remedy, namely a carbolized mixture of lime water and linseed oil. I have also obtained excellent results in stimulating the parts, if the surface involved was not too extensive, from a light cream made from mixing lead and ether together. It seals the parts and makes a satisfactory

dressing. Quite recently I have also had much satisfaction from the use of formalin, using wet dressings. It is an excellent antiseptic, and relieves the pain readily.

DR. JACOB FRANK, Chicago: I merely wish to say a word or two in regard to circumcision. I think if the Doctor had read an exhaustive paper on this subject, extending over two hours, there would still be ample room for discussion on this particular subject. It is a subject not to be passed over lightly. The nations of the world are paying considerable attention to this question. When a government like Prussia tries to pass a law making it obligatory upon her people to circumcise all children, we can fully realize that it is not a subject to be dealt with in a trivial manner, and we should not take it for granted that a little dilatation of the prepuce is sufficient. It seems to me the whole argument is with reference to the looks of the organ. We do not care so much about the appearance of the organ, whether it be split through the middle, or whether we have the skin hanging over the prepuce or not. We want an organ that will insure a man when he is full grown against any trouble resulting from it. It is unnecessary to amputate the entire prepuce, but we should merely take off enough so that the child can retract the foreskin and keep the glans clean. I have circumcised children all the way from the seventh day after birth up. I have also circumcised men who were fathers. As to people going around with sensitive glans, I may say that I have examined thousands of people who have had the prepuce removed in childhood, and also in after years, and I wish to state that they are not any more sensitive than those who have not undergone such an operation. Indeed, the patients I have examined were far less sensitive. My principal object in speaking is not to permit the statement to go out that we should merely dilate in these cases.

DR. E. P. COOK, Mendota: I desire to express my endorsement of the remarks made by Dr. Frank, and I think the time will come when the medical profession will recommend circumcision in cases of all male children as a sanitary measure.

DR. CORR (closing the discussion): I am glad that so many suggestions have been brought out in regard to the treatment of burns. I do not refer now to the milder cases, because nearly all of these get along well. There are many cases of burns in which the pain is so great that the patient wants relief. There are many remedies we can use which will give this relief, but they must not be employed indiscriminately. If a burn involves a wide surface, in addition to relieving pain, there are other effects which we must obviate when our services are sought in many ways. It occurs to me in the case of a burn if we turn a stream of cold water on it relief will naturally follow.

AN INTERESTING CASE OF PYONEPHROSIS.

BY ALBERT I. BOUFFLEUR, M. D., CHICAGO.

While cases of pyonephrosis are sufficiently common to make the general subject well understood, I believe the following case presents sufficient points to enable us to trace the infection to its primary source and thus to make it of sufficient interest to merit its report before this Society.

August 5th, 1897, I was called to Iron Mountain, Mich., to see this patient through the courtesy of Dr. J. A. Crowell, who has kindly furnished me with the notes of the case.

Mr. E. K., 35 years old, married and a timber cruiser by occupation, had always been an exceptionally strong, robust man previous to the beginning of this illness.

In Feb., 1895, two and one half years before, he had noticed that in assuming the recumbent position he would experience pain across the small of his back, which necessitated frequent changes of position while in bed. He did not experience any pain or discomfiture while up and at work. In the pursuit of his vocation he was accustomed to carrying his tent and outfit, weighing over 100 lbs., about in the woods on his back and to sleep out nights. He had previously had a few attacks of lumbago, and supposed that this was of the same nature, although it affected him only on lying down.

In Feb., 1896, he had the measles, complicated by pneumonia, following which the soreness was more marked and constant. The pain after this time was felt over nearly all of the back and the diagnosis of lumbago was made and the patient

placed on salicylates with some improvement of the symptoms.

In Aug., 1896, he began to have an occasional sweat, accompanied by whirling motions before eyes and even temporary blindness. These phenomena would be followed by a severe headache, a complaint from which he had practically never suffered previously. These symptoms continued at short intervals, and in Oct., 1896, he suffered from both night and day sweats.

In the spring of 1897 he contracted a severe cold, which caused an aggravation of his troubles. The attacks became more frequent and more severe and his general health gradually failed and slight emaciation became noticeable.

About the first of May a troublesome spasmodic cough developed. It was attended with severe acute pain in left side and some expectoration.

In June, 1897, a persistent rise in temperature was first detected. Physical examination of chest failed to reveal anything but large mucous räles, while microscopic examination of expectoration failed to demonstrate the presence of tubercle bacilli.

Up to July, 1897, there had been no particular symptoms referable to the urinary apparatus, save the soreness in the back, which became more severe on the left side. About this time the attending physician discovered pus in the urine. Urine was acid and contained only a small amount of albumen, no casts and on a few occasions blood had been detected. Urates always present in abundance. During the month of July the attacks became more regular and were attended by high temperature, severe headache, followed by sweating and the evacuation of a large amount of urine, the amount of pus being on the increase.

The amount of pus would be comparatively small before

and during the spell, but immediately afterwards it was large. Dr. Crowell had detected a marked irregularity in the heart action and slight cyanosis at times, and he also discovered a swelling in the left loin, which seemed to vary in consistency with the attacks; being firm and well defined during an attack, but after 24 hours less distinct and softer. The patient claimed that after lying on the right side, the amount of pus in the urine was noticeably greater.

The salicylates were the only remedies which had favorably influenced the soreness, but large doses were necessary and these were not well borne by the patient, while nothing seemed to affect the urinary symptoms.

On Aug. 5th, 1897, when I first saw the patient, he was just recovering from one of his spells of fever, etc., and was then passing urine heavily loaded with pus. He was pale, skin dry and wrinkled, muscles soft and flabby, tongue badly coated, was very nervous, having slept poorly and suffered severely. A faint tinge of cyanosis made his pallor more striking. The patient presented the typical appearance of one very sick and greatly reduced by sepsis.

Examination revealed a distinct swelling in the upper part of the left side of the abdomen, most prominent in the lumbar region and evidently extending into the left hypochondrial region. There was marked tenderness in the lumbar region. An area of dullness was detected over lower left ribs. Examination of lungs and heart entirely negative. Right kidney palpable but not tender and apparently not enlarged.

The attending physician's diagnosis of pyonephrosis was, of course, readily concurred in. The chronicity of the trouble, the pain, the hemorrhage, the acid urine, and the intermittent discharge of larger quantities of pus with the commensurate diminution in the size of the swelling made the diagnosis of calculus as the etiological cause of the obstruction justifiable, although not positive.

The previous history of attacks of lumbago and chronic rheumatic pains with the exposure incident to his occupation would seem to justify the belief that a condition of chronic lithemia was present, which condition bears an important clinical relationship to the production of renal calculi.

The entire absence of any symptoms indicative of a primary inflammatory affection of the urethra or bladder excluded the presence of a pyelonephritis due to the extension of the inflammation along the continuity of the urinary tract.

The sharp, spasmodic cough with the location of the attendant pain, and the absence of demonstrable lesions of the lungs, lead us to believe that there had been a secondary perinephritis with involvement of the diaphragm. The chronicity of the condition with the general history of the patient had lead the attending physician at one time to suspect tubercular pyelitis, which suspicion had been given some credence by the report that another physician had found bacilli in the urine. Dr. Crowell had made a large number of examinations for their detection but had never discovered any tubercle bacilli, but had found numerous cocci. His excellent equipment for microscopic work and his well recognized care in making the necessary preparations and his ability to judge of the results, gave me full assurance that there were no bacilli in the numerous specimens which he had examined. In addition there was no increased frequency in micturition, no persistent hemorrhages, no granulation tissue or shreds found in urine and no evidences of primary tuberculosis elsewhere ; all of which, with the negative staining, satisfactorily excluded renal tuberculosis.

The chronicity of the trouble, with late development of a swelling which varied in size and firmness with the escape of pus, the absence of large hemorrhages, and the presence of evidences of sepsis instead of cachexia excluded malignant growths.

The diagnosis of pyonephrosis having been made, an immediate operation was advised and consented to. The presence of both kidneys seemed to be assured from the physical examination and symptomatology in this case, and as we did not contemplate performing nephrectomy, the positive determination of both organs being present was not made by collecting urine from both ureters separately. When nephrectomy is contemplated, the presence of the other kidney should be positively determined. As a primary operation we proposed making a simple nephrotomy which would admit of the proper local treatment and drainage of an abscess, and also the removal of a calculus, should one be found.

The operation was performed at the home of the patient with the assistance of Drs. Crowell, Carpenter, Larsen and Cruse. Chloroform was selected on account of the nature and anatomic location of the disease and the absence of any detectable lesion of the heart. The occupation of the patient had been such that the ilio-costal space was remarkably short and the muscles very thick. Even when placed over a large pad, a space of not to exceed three inches could be secured. A long oblique incision was made, but the very great thickness of the muscles made it necessary to make a short, horizontal incision through the abdominal muscles to secure the requisite room for exploration even.

After dissecting through over four inches of muscular tissue a search was instituted for the kidney in its normal position, but it was not to be found. Upon extending the exploration up under the ribs we opened into a large pus cavity, from which welled several ounces of very thick pus, which was evidently not mixed with urine. By digital exploration we readily determined that we had opened into a perinephritic abscess located between the kidney and diaphragm. (This was evidently the cause of the spasmodic cough noted in the his-

tory.) Further exploration determined a connection with a pyelonephritic abscess cavity, the pus from which was more fluid.

The interior of the pelvis was ulcerated and the parenchymatous portion was very irregular in outline. The kidney was firmly attached about its circumference to the diaphragm and its lowest point was over two inches above the lower border of the last rib. Careful exploration of the cavity with finger and probe failed to detect a calculus. A sound was introduced into the ureter for about three inches, where it seemed to be of normal size. A tubular drain was inserted, and after uniting the abdominal muscles which had been divided, the wound was packed with gauze. Owing to the great depth of the muscular wound a portion of the muscle was excised to admit of more effectual packing and drainage.

Specimens of the pus failed to reveal any tubercle bacilli, but large cocci were detected. The subsequent history was uneventful for about four weeks. The temperature dropped to normal and the pulse below ninety on the second day. A large amount of urine passed via bladder and considerable through the wound. After the seventh day but little urine passed through the wound, while 1800 to 2200 c.c. passed via urethra. It was clear, of acid reaction and but little pus could be detected even by using the centrifuge.

He gained rapidly in weight and general health and the wound permanently closed in about four weeks. During this time there would be an occasional temperature of 100° and without any symptoms to account for it, save the closing suppurating wound.

On November 11th, 1897, the patient came to Chicago to see me, complaining of an occasional chill, with some irregular rise in temperature, a morning thickness in his voice, his old cough and some tenderness in both the left and right

loins. The urine showed no pus, was of strongly acid reaction and of relatively high specific gravity. Dr. Crowell had found an occasional granular cast in his urine. He had noted that occasionally the patient was slightly cyanotic and his pulse was irregular, at which times a soft systolic mitral murmur could be detected. Great relief from lithia and salicylates was again reported.

Examination failed to reveal any disease of the heart at this time or to detect any swellings in either loin. Temperature reached about 102° daily and was accompanied by great weakness. He was suffering from anorexia, nausea and faintness and was again losing weight. Dr. Herrick examined the patient at my request and was unable to detect any local conditions to account for the symptoms. The patient was placed on lithia and potash salts, which the attending physician changed from time to time. A gradual improvement became noticeable, and by the first of February, 1898, all symptoms had entirely disappeared. He has regained his usual weight and vigor and physical examination fails to reveal any disease of the heart, kidney or other organs at this time. He is able to dance all right or to take a 30-mile walk without the slightest annoyance in any part of his body.

I desire to briefly call your attention to a few points presented in this case which are considered of special interest and value. First, the history would naturally lead one to believe that the disease had existed for practically three years, without any interruption but with a gradual increase in the number and severity of the symptoms.

Second, its chronicity and symptomatology with reported favorable effect of the salicylates would indicate the presence of lithemia with the probability of lithiasis.

Third, the history indicates the occurrence of a pyogenic infection of a mild type at least one year before, as evidenced

by the occurrence of sweats with malaise and a gradually increasing sense of weakness.

Fourth, the development of pronounced evidences of sepsis probably marked the beginning of incomplete evacuation of the pyelonephitic abscess, while,

Fifth, the persistent temperature and severe spasmodic cough were undoubtedly caused by the perinephritis with subsequent suppuration and a diminution of the cough but with an increase in the evidences of general sepsis.

Sixth, in the positive absence of any suppurative inflammation in the urinary tract we must conclude that the infection of the kidney came through the circulatory channel. While the source of such an infection is not infrequently indeterminable, I believe we can safely conclude that the primary cause was the pneumonia or possibly a mixed streptococcus infection which complicated the measles. Such infections may be of a mild character and metastatic manifestations may not appear for months after the primary affection.

It is easy to understand how, during the circulation of the infected blood through the kidneys and the attempt at elimination of the bacteria by those organs, some of the small capillaries could be obstructed and the development of a new inflammatory process result in the production of a thrombophlebitis from which the pyogenic infection could readily be carried to the heart and result in a septic endocarditis. The mildness and chronicity of the symptoms would indicate a mild degree of infection.

The fact that an irregular and weak pulse, cough, cyanosis and a cardiac murmur with marked irregular pyrexia and chills were present in October, 1897, (after the operation), establishes the presence of a septic endocarditis then, while the same symptoms, excepting the murmur but in a milder form occurring during the month (July) preceding the oper-

ation, probably indicated the existence of a milder degree of septic endocarditis at that time.

The chronicity and recurrence of the symptoms with the absence of permanent valvular lesions would naturally cause one to doubt the existence of a septic endocarditis, but when we remember that there is no definite demarcation between a benign and a septic endocarditis we must agree that the conditions underlying the occurrence of the former would also influence the course of the more serious form, and if the infection was of a mild type, the course of the disease might be quite similiar. The occurrence of a transitory murmur is not incompatible with the history of a septic endocarditis. While a permanent lesion usually results, it by no means invariably does so.

I should state that possible malarial and typhoid infections were excluded by repeated examinations and tests. The absence of a detectable calculus at the time of operation merely demonstrated that, while the symptoms justified the diagnosis of its probable presence, it was, as has frequently been the case, undetectable at time of the operation. The probability still remains that there had been a calculus or at least some other local condition to cause the localization of the secondary infection in the left kidney.

While it is easier to explain the cause of the infection as above, it is possible that a sub-acute septic endocarditis resulted from the infection, complicating the measles, which in turn caused the infection of the kidney and resulted in the pyonephrosis.

The explanation, then, that I would offer for this chain of septic manifestation is, that the primary disease was lithemia with possibly lithiasis, and that following the measles and its complications a sub-acute form of septic nephritis and pyelitis developed, resulting in the development of a suppurative pye-

lonephritis and perinephritis, which were in turn followed by a septic endocarditis; and while the local conditions incident to the secondary renal infection were promptly relieved by ordinary surgical treatment, the intra-current septic endocarditis pursued its usual course uninfluenced by any treatment save rest and possibly the administration of the salicylates.

DISCUSSION.

DR. JOHN A. ROBISON, Chicago: *Mr. President*—This is a very interesting and instructive paper, and to my mind it would have been almost perfect if the author had not insisted quite so much upon calling it septic endocarditis. As he states, there is no well marked line between benign endocarditis and septic endocarditis, but in the treatment of septic endocarditis, in the natural history of such cases there is a marked distinction. It has been my experience that septic endocarditis is the most difficult form of heart disease in which I get favorable results, and I am inclined to think that Dr. Bouffleur would have been on the safer side to have stuck to his first theory, that the endocarditis was doubtless due to lithemia. The conditions in the patient were such that when there was a departure from the ordinary degree of health there could readily be produced in the blood so much poisonous material, the foundation of the lithemic condition, as to bring about endocarditis. Also the attacks of endocarditis occuring at different intervals would strike me that the endocarditis was not septic but rather benign in its character. That is the only point that I wish to mention, otherwise the paper was certainly a very interesting and instructive one.

There is one other feature in the paper that I might mention, namely, that in the early history of the disease a diagnosis of lumbago was made. We will find in quite a number of cases of pyonephrosis that there is a history of lumbago, and many a case has been diagnosticated as lumbago which has turned out to be pyonephrosis. This is an important point for us to remember. Whenever a patient complains of a severe paroxysmal pain in the back in the region of the lumbar nerve, it is well for us to remember the possibility of there being a nephritic complication.

DR. E. M. SUTTON, Peoria: The first case of pyonephrosis that came under my observation was one that had been subjected to a laparotomy, and in which a favorable prognosis was given. The enlargment in this case was about the size of an Osage orange. The patient was sent home from the hospital and it was thought that she would not

live long. The symptoms became worse and a diagnosis was later made by another physician. I was called in to operate and the operation was followed by recovery. We found an abscess which was full of pus. A sinus continued to discharge for fourteen weeks. I supposed it was a tubercular case, but inasmuch as the husband suffered from tuberculosis there was no trouble in making an early diagnosis in this particular case.

The second case of pyonephrosis I saw was the result of the pressure of a calculus. A correct diagnosis was not reached until the abscess had attained an abnormal size and its contents evacuated. In this case a sinus continued and it became necessary to remove the entire kidney.

DR. L. R. RYAN, Galesburg: There is one form of pyonephrosis which is more difficult to diagnose than the one which has been described here to-day. A short time ago I had a case in consultation on account of some difficulty with the eyes. There was a marked diminution of vision, supposed to be due chiefly to nephritis or the ordinary form of Bright's disease. I made a careful examination of the urine at my first visit and found that it contained abundance of pus and epithelium from the bladder and kidney. At subsequent examinations I found that there was no ephithelium, or at least there were but few epithelial casts found and the pus had disappeared. I made a series of examinations at intervals of every three or four days and at the end of a month I again found pus and epithelium in abundance from the bladder and kidney. I have watched the case carefully for several months, and I found that at certain periods there is an abundance of pus and epithelium present, while at other times the urine is free from albumen and there is no sign of pus or of epithelium. We have to make a differential diagnosis as to the possibility of its being simply an infection of the bladder, abscess of the bladder or abscess of the kidney. We have, of course, in these cases pain in the loin upon deep pressure. In this case I felt certain that it was one of abscess of the kidney with periodical discharge of pus, and I think we are often misled in such cases simply because we cannot find evidences of disease even though we make systematic examinations at short intervals, and the discharge takes place even after we cease to make examinations.

DR. BOUFFLEUR (closing the discussion): I do not agree with Dr. Robison in regard to the case reported by me. The points upon which I passed the opinion of the septic nature of the endocarditis were well established. I stated that we had the ordinary symptoms of endocarditis, in addition to which there were marked interrupted manifestations of sepsis, such as a high interrupted temperature attended by

chills. We do not get an interrupted temperature attended by chills in the benign or non-septic form of endocarditis. We get those symptoms only in sepsis. I am not speaking of the degree or character of the sepsis, but we have symptoms of sepsis in addition to the physical evidences of endocarditis.

One point in the paper which I skipped is of considerable interest, namely the abscess which we frequently find and which we open into first is not the primary abscess. We often open into a perinephritic abscess which is not the cause of the trouble, and therefore our operations are oftentimes not successful, because we are content with simply opening and draining the superficial abscess. This was the case here because we had to deal with an abscess between the kidney and diaphragm. I operated on a similar case recently in which quite a large abscess outside of the kidney was found filled with very thick pus, but after perhaps ten minutes search we found a small opening into the pelvis of the kidney. The abscess was about the size of a hen's egg in the substance of the kidney, but still not involving its pelvis. A still further search brought us in contact with a cavity containing fluid pus, and from this we judged we were in the pelvis of the kidney, so that we had three abscesses to open, whereas ordinarily only the superficial abscess is opened. I am absolutely certain that this was true in the case reported. I entered the pelvis of the kidney because I passed a sound down through the ureter, and I am also certain that the condition present was one of distinct sepsis, and I do not see why we should have endocarditis with an interrupted temperature unless it was of a septic character.

The case mentioned by Dr. Ryan as having an intermittent discharge is one of the diagnostic points of pyonephrosis, and especially one in which the distortion is caused by kinking of the tube, interfering with the continuous discharge of the pus.

I should state that the differential diagnosis between cystitis and pyelitis can be made usually not only by examining the tissue and the urine, but by remembering that cystitis is attended by alkaline urine, and pyelitis by a strongly acid urine. Frequently both varieties are present, and in that case we cannot rely upon the microscopical findings. If there is blood and we find blood casts, then, of course, we may consider it comes from the kidney. I did not pretend to cover the whole ground in my paper, although I thought there were points of sufficient interest, together with the septic phenomena, to present the case to you, and I wish to thank the gentlemen for their discussion.

PATHOLOGICAL HISTOLOGY OF INTESTINAL UNION, AFTER THE USE OF THE FRANK BONE COUPLER.

BY JACOB FRANK, M. D., CHICAGO.

The advantages of different mechanical devices or of different suture methods in intestinal anastomosis cannot be estimated by the simplicity of the contrivance nor by the amount of time required to perform the operation with either this or that device or suture method. Our main efforts are directed towards leaving the lumen of the intestinal canal with as large a caliber as possible after it has once been severed and united, for if too great a stenosis results, our work has been in vain, whether it required twelve minutes or three hours at the primary operation.

This leads me to the pathological histology of the repair of intestinal wounds. I wish to preclude all that follows with the statement that the experimental specimens were obtained from dogs.

Section removed ten days after date of operation. Macroscopical appearance: There is no adhesion or matting of the intestines and the point of approximation can be found only by running the bowel through the fingers, when a slight ridge is felt. There is a little thickening of the bowel at this point. On the inner surface of the bowel, projecting over the mucosa, is a smooth line, marking the point of union.

Microscopical appearance: All the layers are in juxtaposition.

Mucosa: This is somewhat thickened and the ridge above-mentioned is seen. This ridge has no villi, nor does it in the

least resemble normal mucosa; it consists entirely of small, round, inflammatory cells, closely packed. On either side the normal mucosa is seen.

Muscularis mucosæ: The ends are separated; the gap is filled in with round connective tissue cells.

Submucosa: It is thickened at the line of union, but is continuous. It is very vascular. The blood vessel walls are also thickened.

Muscularis: The circular and longitudinal coats are distinctly cut off at the line of union. The cut ends present some proliferation of the muscle cells, but the muscles have not regenerated, the gap being filled in with a loose, very vascular connective tissue.

Serosa: This coat is very much thickened and very vascular. The new-formed tissue is easily distinguished from the old by these features. The connective tissue is very loose, having the appearance of a network of mesh.

Section removed after sixty days. Macroscopical appearance: No adhesions or matting of intestines are found. The point of operation is hardly distinguishable. A slight ridge is felt at the line of union. There is very little contraction of the lumen of the bowel, the index finger passing easily. On the inner surface of the point of union is a small groove. The lymphatic and blood vessels run across the line, giving the bowel quite a normal aspect.

Microscopical appearance: The various layers are in perfect juxtaposition. Continuity has been established in every layer except the muscular, and regeneration has been established in the mucosa, submucosa and serosa.

Mucosa (60 days): The mucosa is continuous and unchanged, showing no formation of new tissue. There is at the site of union a falling inward of the villi, an entropion as it were, due probably to the cicatricial contraction of the scar

tissue beneath. The tops of the villi thus drawn down meet with those of the opposite side, presenting an appearance as though they had been piled up. There is no connective tissue formed between the villi.

Muscularis mucosæ has not become continuous, the ends being separated by scar tissue.

Submucosa has an almost normal appearance. It is continuous and regenerated, although it is slightly thickened. Blood vessels are prominent, being also thickened.

Muscularis: The outer layer is united by connective tissue into which a few muscle fibres project from either side. There is, however, no regeneration. This layer is closely applied to the serous layer. The ends of the inner layer are nearly in apposition and look like spindle-shaped processes. Connective tissue connects them, and no muscle fibres can be seen projecting into it, as in the other layer. Although there is some proliferation of the muscle cells in the cut ends, there is no regeneration. The connective tissue fibres on each side of the line of union run from the muscular to the serous layers.

Serosa is thickened and more vascular than normal. The cicatricial tissue is distinguishable at the line of union, and is arranged as above mentioned.

Section removed after ninety days. Macroscopical appearance: There are no adhesions between omentum and bowel or loops of bowel. Site of operation hardly distinguishable, except for a trivial line which is felt. Appearance of bowel is normal. On the inner surface hardly anything is seen to indicate an operation. The lymphatics and blood vessels cross the line of union and are readily discernible. Bowel is patulous and but slightly contracted, the finger passing easily.

Microscopical appearance: There is little difference between this specimen and the previous one. The scar has contracted more than in sixty day specimen, which has brought

the cut ends of the different layers into closer apposition, making it almost impossible to distinguish the line of union. The mucosa and submucosa have the same appearance as in the sixty day specimen. The muscularis mucosæ is also the same. The muscularis has not regenerated and presents the same appearance as in the previous section, as does the serosa.

Section removed after sixty days, Murphy button. A Murphy button was carefully introduced in a large, healthy dog and the section removed after sixty days.

This specimen varies slightly from the specimen produced from the coupler, the only difference being that the ends of the muscularis are in closer apposition in the coupler specimens than in the button specimen. There is no regeneration of muscle in either instance, connective tissue intervening between the ends.

Eleven months specimen. The old dog was fat and healthy looking. The line of abdominal incision showed union without adhesions of the underlying viscera.

The intestines showed no evidence of old peritonitis. The point of operation was found 2 6.10 cm. from the cæcum. There was no distention of the bowel above the point of operation. The omentum is attached at two places. One is over the line of union; the other is 1 cm. therefrom. Each is slight and inconsequential; over the scar the peritoneal *coat lies evenly.* The blood and lymph vessels are continuous from one side to the other.

When the post-mortem was made, the intestines were still in motion, and it was noticed that the line of union caused a break in the muscle wave.

Intestine in situ unopened. There is noticed a V-shaped indentation over the free side of the intestine; this is about 0.2 cm. in depth. It is not appreciable over the remainder of

the intestine. Around the intestine is a linear scar. In the mesentery, 0.2 cm. from the intestine, is an oval mass about 1 cm. in diameter. Over it the peritoneum glides smoothly. The mass is joined in the scar by a line of scar tissue. This piece was removed for microscopic examination.

Intestine removed, unopened: The finger gently passed through the lumen, appreciated the line of union as a thread-like band, giving the sense of resistance to expansion, rather than decrease of lumen.

Intestine removed, opened: The mucosa is continuous over the line of union. Cross-section over the scar shows that in places there is a slight projection into the lumen. In the submucosa and muscular tunics there is a narrow band of connective tissue.

The sections for microscopic examination were made longitudinally. They were from two places—one from the distal, the other from the proximal side. In some sections there is a wedge-shaped depression that is about 0.6 mm. in depth. In others there is a pyramidal elevation that rise 0.75 mm. Mucosa is joined to mucosa, muscularis to muscularis, etc.

Mucosa: This coat is continuous over the scar without a break. The epithelial glands, the villi and the cells themselves are absolutely unchanged. The muscularis mucosæ runs into the cicatricial tissue.

In the area of circular muscular fibres the scar reaches its greatest breadth. It is here 0.8 mm. broad. In the longitudinal muscularis it is less broad.

Scar: The connective tissue fibres run from the serous coat to the muscular coat; generally they are in two groups, with what appears to be some old tissue remnants between the two bundles. The direction of the fibres has a bearing on the question of subsequent contraction. The fibres are as old, dense and free from nuclei as one would expect in inflam-

matory connective tissue that is a year old. In this area, and especially near the summit, the region corresponding to the old sub-mucosa, there is an abundance of blood vessels. Their direction is generally circular and their walls blend intimately with the surrounding tissue.

There is some inflammatory thickening in the serous coat. No sutures were found. Nodule from mesentery; this is a very small mass of inflammatory tissue. In the centre is a silk suture.

Conclusions. From the microscopical study of the healing of intestinal wounds after some of the various suture methods and mechanical devices, I have arrived at the following:

1. That no suture method insures an exact coaptation of the various layers. The Czerny-Lembert suture, considered one of the best of the many suture methods, does not insure a perfect line of apposition. Frey Wölfler's assistant is of the same opinion. In a specimen three weeks after operation, after the Czerny-Lembert suture being used, there was a marked turning in of the ends of the bowel. The mucosa in this specimen is not yet regenerated.

2. In regard to the invagination suture method, I will refer to but one briefly, that of Harris, which will stand as a type for the others. Union takes place, but the different layers are not in juxtaposition and the lumen of the bowel is greatly encroached upon. This is not alone visible, microscopically, but very readily macroscopically. The microscopical specimen was obtained sixty days after operation from a dog operated upon by Dr. Harris himself.

3. That all suture methods leave the subsequent lumen of the bowel more stenosed than either the Murphy button or my coupler.

Referring to the different layers after the use of either the Murphy button or my coupler, I have noted the following:

That the mucosa regenerates completely and that it shows an entropion, which is due to the contraction of the underlying scar.

Boari, in his experiments with the modified Murphy button, claims that there is no regeneration of the mucosa. Murphy, in his experimental work, finds a complete regeneration of the mucosa.

The muscularis mucosæ is lost in the scar tissue.

The submucosa blends with the cicatrix and presents no change from the normal.

Muscularis: Neither the inner circular nor the outer longitudinal fibres show any regenerative process.

Dr. L. Hektœn, in his report on Dr. Murphy's button operation sections, states that after thirty days the longitudinal muscular can be said to be almost restored, and the transverse muscular completely united by connective tissue. In describing the section which was removed after sixty days, Dr. Hektœn says that the longitudinal and circular muscular layers are continuous and not distinguishable from those in the normal intestine, except that they contain some small spaces (blood vessels) and occasional traces of fibrous tissue.

I must differ with Dr. Hektœn, as I have not found this condition in any of my specimens, nor in that made with the Murphy button on a dog killed sixty days after operation. The most conspicuous part of the scar is the non-regeneration of the muscular coats, and it is the feature which at once attracts one's notice upon looking at the section through the microscope. Dr. Hektœn further says that were it not for the thickening described in the submucosa and muscularis mucosæ, it would be difficult, if not impossible, to recognize the line of union.

The submucosa beyond question is thickened, but not so much so as to make it a prominent feature; this layer is re-

generated, and as for the muscularis mucosæ, it, like the muscular coats, has not regenerated.

I do not question that some muscular fibres may grow out into the scar and meet, but they are not sufficient in number to call the process a regeneration. Even this is not found in any of my specimens, Murphy's and suture methods made by myself. The cutting of the muscular coat acts as a stimulus and the result is a proliferation in the cut ends, but the connective tissue grows far too rapidly to permit a regeneration.

Serosa: This layer is invariably united perfectly and is closely applied to the muscularis. Owing to the irritation and reaction resulting therefrom, it is considerably thickened and more vascular, but otherwise presents no change.

The Scar. The fibres of the cicatricial tissue run from the serosa to the muscular coat. The direction of the fibres has an important bearing upon the subsequent narrowing of the lumen of the bowel. The fact that the fibres run from the serosa to the muscularis, tends to increase the lumen of the bowel when contraction takes place, by lessening the thickness of the intestinal walls themselves. If the fibres took a circular direction a pathological stenosis would ensue upon contraction.

DISCUSSION.

DR. A. I. BOUFFLEUR, Chicago: *Mr. President*—I do not wish to consume very much of the time of the Society in discussing the very valuable paper of Dr. Frank, because he has covered the ground very thoroughly. However, I desire to emphasize one of the points made by him, namely, that any device to be generally and permantly successful must be one which interferes as little as possible in order that restoration shall occur quickly. There is more or less danger of infection in open intestinal wounds from pressure necrosis, and consequently we want the wound as little open as possible. The great objection to the Murphy button has been that, as a foreign body, it is necessary for it to pass through the intestinal canal which, by the way, it does not do in some cases. Therefore if the device of Dr. Frank

is an absorbable one it is a distinct improvement. The objection formerly raised to the Frank coupler as to the instability of the fragments is one which I believe he has been able to overcome. The only non-absorbable substance is a small rubber section which is so small that there will be no difficulty in its being passed.

I am glad indeed to have had the opportunity of seeing his admirable demonstration of microscopical specimens. Nothing is more convincing than specimens taken at different times after an operation for intestinal anastomosis.

DR. JOSEPH B. BACON, Chicago: I have listened to Dr. Frank's admirable paper with a great deal of interest, and his device is certainly an improvement over the Murphy button. For some five years we have been using the Murphy button which we were all enthusiastic over and it has been somewhat disappointing. For instance, Dr. Fenger read a paper recently before the Chicago Medical Society in which he stated that he had discarded the Murphy button entirely and had returned to the method of suturing, giving as his reasons for so doing several cases in which death had occurred from the button causing sloughing of the parts and remaining in the peritoneal cavity.

If the device of Dr. Frank does not produce pressure necrosis too rapidly and it is an absorbable substance and does not remain in the intestine as the Murphy button has done, acting therefore as a foreign body, we have a great advantage from its use in the line of mechanical devices. As so many accidents have been caused by the use of the Murphy button, a great many surgeons feel a little reluctance in using it and have returned to the old method of suturing the intestine. Since the Murphy button and other divices have been placed before the profession a large number of medical students have graduated and it has been impossible for them to familiarize themselves with the method of suturing so as to become experts, consequently they find it much more convenient to use a mechanical device for cases of intestinal anastomosis.

DR. E. M. PATTON, Quincy: In connection with this matter of mechanical devices for intestinal anastomosis, I wish to say that my friend beside me was operated upon by Dr. William Byrd, of Quincy, some sixteen years ago by the suture method, before the days of the Murphy button, and she has just returned from a journey of three thousand miles. The condition for which she was operated upon was a strangulated hernia, requiring union of the two ends of the intestine.

DR. FRANK: I would like to ask the last speaker whether a drainage tube was used in the case related, or whether the gut was sewed into the wound?

DR. PATTON: The ends were placed together in this manner (illustrating) and then sewed into the side of the wound.

DR. FRANK (closing the discussion): The case reported by the doctor (Dr. Patton) was not a typical end to end enterorrhaphy. It was the old way of operating, and I may say here that it was very rare indeed that anybody recovered from such an operation. However, I am very glad to see the lady here to-day, because I have had quite a number of cases operated upon in the same way and they have all died. It is not the way surgeons operate to-day. We may operate on a case of gangrenous hernia to-day, and in three or four weeks the patient is able to come to the office. Some of the patients operated on by the old method were confined to their beds months, or perhaps years. I received a letter from Dr. Andrews, of Chicago, a short time before I left for this meeting in which he said he had operated on a case of gangrenous hernia. Of course this has no bearing upon the pathologic histology of intestinal union, but he says at the end of four weeks the patient came to his office. In this case he removed eight inches of the bowel and found the sac full of pus.

There is only one more point to which I wish to call attention, as I fear that I may have been misunderstood, namely, I do not believe that there is any mechanical method where the muscles can be made to regenerate after they have been once divided in the intestinal tract. I have taken a different view of this subject than most of the writers in Germany and in this country. They have never produced any photographs to prove the contrary and their work has always been done by hand drawings.

THE REPAIR OF BONE.

BY H. C. FAIRBROTHER, M. D., EAST ST. LOUIS.

For some years past I have paid some special attention to the process of bone repair. I have studied this process in fractures, simple and compound, in resections, contusions and irritations of bone, and in amputation stumps ; and in addition to these means of observation I have caused bones to be fractured in a number of dogs and fowls, and after killing them, observed the condition of repair at different periods of time. There may be nothing new in these observations, but they are original and I present the result of them to this society.

When a fracture takes place, usually some swelling occurs immediately. This is caused by the extravasation of blood. In the course of twelve hours there is an additional swelling, the result of inflammation. If in the fracture, there is little damage to the soft parts, the inflammatory swelling may be so slight as not to require readjustment of the dressing. But if the fracture is severe, this swelling will be so great as to render a readjustment of the dressing absolutely necessary within two or three days time. If this is not done, sloughing is liable to occur at some point, which not only seriously complicates the treatment of the fracture but renders the surgeon liable to a suit for malpractice.

At the point of fracture there is an effusion of blood, a portion of which is absorbed, as shown by the bronzing of the skin

in the neighborhood, and a portion remains to become incorporated with the coagulable lymph, forming a matrix for the new bone development. The slighter the fracture, that is, the less the damage to the periosteum and soft parts, and the better the adjustment of the fragments, the less will be the amount of this bone-plasma. This matrix for bone repair generally begins to take definite shape about the end of the first week. At that time it resembles a blood coagulum, except being lighter in color. It forms in a gelatinous mass about the fragments, or about the ends of the sawed bones in amputation stumps. It is not always definite in position, but often forms in the direction of the least resistance. And this accounts for the fact, often observed, that fracture callus is frequently found not directly or most advantageously around the points of the fragments. We are accustomed to hear that this callus and bone repair process is very definite and beautiful, and accomplishes only the object for which it is designed; that in fractures this provisional callus forms a band around the points of the fragments and holds them together until united and then disappears by absorption ; that, in amputation stumps, it forms only a cap over the mouth of the medullary canal to preserve the continuity of the cancellous structure. But, from closer observation, however, it appears that this callus formation is often very irregular and eccentric, and sometimes a very useless and even injurious process. It often forms on one side only of the bone, and not even covering the point of fracture, and fractures where callus appears the most needed, as in the patella and skull, none at all is formed. In fractures or amputations of the forearm or leg it often forms a solid and permanent bridge between the two bones, thus preventing entirely the valuable function of rotation. When once set in motion this bone-forming process often continues for months, or even years, in the most erratic way, and in-

stead of being absorbed, continues to grow, producing a permanent and often painful deformity. I exhibit here a resected portion of the tibia and fibula, made some years after an amputation at upper end of lower third in a boy twelve years of age. The resection was made on account of the severe and continued pain in the stump, and the want of proper covering for the bone. The pain was doubtless due to the involvement of a nerve in the new bone-growth, as it has not occurred since the resection. From the appearance of this specimen it is evident that each bone has grown at least half an inch in extent since the original amputation, and you will observe they are united by a bridge. Thus, we may sometimes see a stump where the bones seem almost bursting through the skin, and the surgeon is blamed for not securing better flaps, whereas the trouble may be due entirely to the growth of new bone.

After the end of the second or third week the mass begins to assume the cartilaginous form, and there may be distinctly felt, distributed throughout this substance, sand-like points, which, upon examination, are found to be calcarious formations. These become enlarged by accretion and finally assume the true bony structure. They continue to increase in size and number until they finally coalesce, making continuous bone. This process is very much like the crystalization which takes place in fruit jelly, and any disturbance of the parts at this critical time breaks up this crystalizing process and delays the union, and may defeat it altogether.

An excellent opportunity was afforded the surgeons of the Air Line R'y Company, while in session in East St. Louis a short time ago, to observe this bone matrix just passing into the callus state. In a double amputation at the middle of the legs, performed a month before, the flaps on both stumps had sloughed—a very frequent occurrence in double amputa-

tions. Upon separating the granulating tissues from the ends of either tibia there could be seen a mass of grayish-white jelly-like substance resembling egg albumen. Upon rubbing this mass between the thumb and fingers the bony trabeculæ were plainly perceptible.

There is often quite a marked difference observed in the reproduction of bone in parts exposed to air and in parts not so exposed. In the former the process more resembles granulation; there is less of the cartilaginous appearance and all projecting points of bone come away by necrosis, while in the repair of bone in places not exposed to air, as in simple fractures, the ends of the fragments become covered at a very early date by a smooth, shining cartilaginous membrane, cartilage bands join them together and all sharp projecting points become absorbed, first by losing their earthy salts and afterwards the animal matter.

With regard to the time required for the union of fracture there is a great difference of opinion. In fact no general statement can be made upon this point. The age and health of the patient, the character of the fracture, the adjustment of the fragments and the kind and manner of dressing applied are all factors in this result. In some cases, but these are very rare indeed, union takes place by a sort of glueing process which requires only a few days. I have observed this to take place in one case of a fracture of the lower jaw. And also in the case of a dog whose humerus I fractured; the plaster dressing was chewed off on the seventh day and I found him playing about the yard, and not even lame upon this leg. Upon examination the union seemed to be firm. But this is a very rare exception to the usual rules in fractures in animals or fowls. Usually the result in these cases is bad on account of the great difficulty of maintaining dressings in position, which are fought against by every possible en-

deavor. But if proper splints can be maintained the time and manner of healing corresponds to that in man. In these rare cases of apparently immediate union there is no formation of callus or development of bone, but a union by first intention as in the soft parts. In the usual process of callus repair three weeks is the earlist time at which osseous union may be looked for; but when the patient is aged or infirm, or the fragment widely separated, or the reduction imperfect, or the dressing improper, or the patient disobedient, complete bony union may require three or four months, or it may never occur. The repair of a fracture is often deceptive. It may appear to be firmly united, the usual time has elapsed, the splints are removed, but after one or two weeks the patient returns with a marked deformity. Little can now be done to remedy the defect. Further dressings are practically useless. But if a deformity occurs at an earlier date, either by the formation of an abnormal callus or the displacement of a fragment, much can be done by the application of pressure. But pressure applied for this purpose requires careful watching to prevent gangrene. The thigh bone is the most frequent to result in deformity from the too early removing of the dressing. Deformity and shortening are the usual sequels to the fracture of this bone under the best treatment, but these are frequently greatly increased by removing the splint at too early a date. It is probably true that the majority of deformities from all fractures are due to a too early removal of the dressing. The support is removed before the ossifying process is fully completed, and the cartilaginous structures yield to the tension of the muscles. A frequent and often very valid objection to allowing the dressing to remain longer is the stiffness produced in neighboring joints. Many surgeons have the rule of immobilizing the two joints nearest a fracture, and this is a very good rule in the thigh or leg, but cannot

well be executed in the arm or forearm. Now, no joint can be kept long immobilized without damage; and this is especially true when a fracture is near to or into the joint. In that case the joint is affected by the inflammatory process, as well as by the lack of motion. Thus in fractures of this kind it becomes a very serious question when to begin passive motion. In fractures near the elbow, for example, if full time for bony union is allowed, we may have complete anchylosis. On the other hand, if the dressings are removed even temporarily for passive motion at too early a date, the delicate process of bone crystalization may be disturbed, the inflammation increased, a larger amount of callus be thrown out and the result gravely complicated. Fractures in the neighborhood of joints are always liable to result in more or less stiffness and patients should be so informed.

One other point in connection with the repair of bone I will refer to only briefly, and not as a teacher, but as an inquirer, viz.: whether the periosteum is the main or only source of repair-bone products? I am aware this is the usual teaching of authors on the subject of bone repair. But a number of cases coming under my observation of osseous deposits that seemed independent, not only of the periosteum, but of all the bone tissue, I am led to doubt this teaching. Two cases may be cited.

1. Some years ago I amputated a thigh in the lower third. The patient was old and poorly nourished and the stump did badly. The flaps sloughed and retracted and after three months a resection was made. Upon dissecting up the soft parts three inches above the end of the bone stump, a ring of true bone was discovered about one fourth of an inch in diameter extending half way around the thigh, situated near the surface and at no point approaching the periosteum.

2. During the past winter there came under my care a

compound fracture of a finger with much crushing of the parts. A chronic non-suppurative form of cellulitis ensued, the finger was distended to twice its normal size, and after two or three months amputation was performed. In dissecting through the mass of newly formed and partially organized tissue, in order to examine the site of fracture, there were found numerous small bony spiculæ, usually about one eighth of an inch in diameter. Many of these were lodged near the skin and none of them seemed to have any connection whatever with the periosteum. These were not merely calcarious deposits, but true centers of ossification and possessed all the elements of genuine bone.

Numerous other cases have come under my observation not only in compound fractures and amputation stumps, but also in cutting down upon fractures, where the callus forming exudate was deposited far away from the periosteum. In the amputation stump above referred to and witnessed by the Air Line Surgeons, this jelly-like slightly cartilaginous mass was not formed evenly within the cuff of the periosteum but was strewn about in an irregular manner, lodged in the muscular interspaces and frequently at some distance from the periosteum. Now the frequent witnessing of cases like these naturally lead to the conclusion that the ossifying plasma may be an exudate from the circulation and not an outgrowth from the periosteum or any of the bony tissues.

It may be admitted that this bone plasma will only be deposited upon irritation of the periosteum or the bone. The effect of this irritation is of common observation. I recently had occasion to keep a drainage tube for some weeks between two ribs. Afterwards, in attempting to resect one of these ribs at this point, I found a bridge of bone had been thrown across on each side of the tube, the result simply of periosteal irritation. In the laboratory of the blood are con-

tained all the tissue elements, and upon the lesion or irritation of any tissue there will be deposited from this fluid, at the point of lesion, a lymph containing all the elements necessary for its repair. If the injury is to cartilage, cartilage cells only will be deposited. If the injury is to bone, a mass will be formed containing not only the hyaline cell of cartilage but also the earthy salts.

Further than this it may even be maintained that bone is formed without even so much as the irritation of the periosteum or bone. Dr. John Stack reports a case from the St. Louis City Hospital where a man came into the wards for a stiffness of one of his thighs. Upon examination a hard substance was discovered lying along the outer and posterior surface of the thigh. The patient gave a history of a blood tumor formed in this location some years before and caused by receiving a kick. As the tumor disappeared its place was taken by this hard body. Chloroform was given, the body cut down upon and dissected out. When examined it was found to be a bony slab about five inches wide, twelve inches long, one-fourth of an inch in thickness, and convex to suit the contour of the outer surface of the thigh. In this case there was no evidence whatever of injury to the bone or irritation of the periosteum. Also, there have been reported tumors containing portions of true bone and tendons that have passed through the calcifying process into bone structure.

Some years ago I witnessed in a museum a pitiful object exhibited as the "ossified man." To the touch this man presented the feeling of a person solidly frozen, with the exception that the skin was soft and not adherent to the hard substance beneath, and near the normal temperature. He looked out from this prison of stone with an appealing gaze like one that wished to be liberated. Whether this calcifying process had continued to the formation of true bone was not determ-

ined, but his manager presented numerous certificates to the effect that the hard substance felt everywhere beneath the skin was true bone. If this be true, the formation of bone in some instances at least may depend entirely upon the blind forces of metabolism, and any tissue of the body, or all the tissues together, may, under certain mysterious conditions, surrender to the process of ossification.

DISCUSSION.

DR. WM. M. HARSHA, Chicago: *Mr. President*—I enjoyed the paper of Dr. Fairbrother very much. There is one point, however, raised by him in the last part of the paper, which is at variance with my experience and that is with reference to new bone formation. If I understood him correctly, he stated that the general teaching is to the effect that the periosteum is the only bone-producing tissue. As I understand it, in a fracture the bone is divided, the periosteum is divided, the endosteum is divided, the medullary tissue is divided, the connective tissue outside of the periosteum is divided, and it is my understanding that every tissue which is injured in the fracture undergoes repair. It is true the inner side of the periosteum, that is, the side next to the bone, is the principal factor in the osteo-genetic process, but the ends of the bone, if they are not coaptated perfectly after the fracture, undergo the process known as osteo-porosis, that is, the cancellated structures become more spongy, the dense bone becomes more porous, granulation tissue takes place in the new porous bone formation at the ends, and so we have new bony tissue thrown out from the ends of the bone. If the ends of the bones are separated an inch or more, the periosteum is not always divided throughout, but remnants of it remain in the end of one bone or fragment which will permit of examination from the end of one fragment to the end of the other. As I understand it, all the tissues which have been damaged undergo repair by a process from the tissues themselves. Within a week or ten days I have wired fragments of bone together in a tibia which had been ununited, the case being one of compound fracture of three or four months' standing, and in both ends of the bone no bearings were used. They could be bored through an inch away from the ends very easily, showing the condition of osteo-porosis I have tried to describe.

DR. A. C. CORR, Carlinville: I was very much pleased in listening to the excellent paper which Dr. Fairbrother has presented, but I cannot discuss the histological process in the development of the repair of

bone after fractures or dislocations. He has done that well and has given us facts that will lead us in general practice to consider this a matter of importance. I think in 1879 Dr. J. H. Hamilton read before this Society a paper which dealt exclusively with fractures and dislocations, and it consisted largely of reports from men engaged in general practice who had been treating fractures all over the State of Illinois. He dwelt upon bandaging, etc., and reported that there were many cases in which there was no shortening of the long bones. Dr. Fairbrother has brought that point out here to-day and I am glad of it. At that time Dr. L. R. Pierce made a motion to reconsider a portion of Dr. Hamilton's paper with reference to the statements that there was no shortening of the long bones in cases of fracture, saying that it would be dangerous to practitioners to permit that statement to go on record. The matter was so changed as to read that there might be cases of fracture in which there was no shortening, but that, as a rule, there would be more or less of it. There was a committee appointed on that occasion to measure one of the window panes in a window in the hall, and of three or four men who had measured the pane there were no two that agreed. This was regarded as evidence that in measuring a limb as to shortening after a fracture physicians very seldom agreed, and for this reason a statement was placed on record to the effect that no physician ought to make a prognosis in any case that the patient would get repair of the long bone, especially the thigh, without some shortening. I do not think this point has been raised in this Society from that time until now. Since then I have seen men involved in malpractice suits for just that kind of information prevalent among the people. If we cannot get good results it is not worth while to tell our patrons about it. We must not expect good results in fractures occurring close to the joint, and I do not think any man, woman or child ought to be promised that they will get a perfect result where the fracture occurs near a joint for the reasons given by Dr. Fairbrother. At about the time of which I spoke we were then driven to the use of plaster of paris dressings. Dr. Sayre and Dr. Frank Hamilton had been discussing the subject of fractures. Dr. Sayre held the opinion that in a great many cases of fractures of the long bones they could be so treated as to have no shortening, while Dr. Hamilton took the opposite view. Dr. Hamilton went so far as to examine Dr. Sayre's cases and stated that he had found shortening present. Dr. Hamilton in his book, which he wrote after that, placed himself on record as saying nobody ought to say that a plaster of paris dressing would prevent shortening. This point of shortening is worthy of thorough consideration, and we as physicians ought to be careful as to the manner in which we place cases on record in this respect.

DR. A. I BOUFFLEUR, Chicago: I wish to mention a point or two in connection with Dr. Fairbrother's paper. The repair of bone is a simple process and so analogous to that which we find in wounds of soft parts that I think there should be no difference of opinion as to the manner in which union of bones takes place. All bones heal by granulation tissue primarily. There is no wound which heals without a new production of granulation tissue. I do not mean this in a clinical sense. We used to say that wounds heal by granulation instead of by primary intention, but all primary wounds heal by identically the same process. One is greatly delayed by the occurrence of sepsis or of suppuration. Bony union goes one step further and in addition to there being granulation tissue in the formation of connective tissue, the connective tissue becomes in some instances cartilage; in other instances it goes still further and becomes bone and anything short of bone results in what is known as co-called ligamentous union. It is a step in the granulating process.

The first specimen presented by Dr. Fairbrother is a very interesting one, amputated I believe at the low third, very low down near the ankle. It illustrates the fact that in children we want to be exceedingly careful to leave not only the ordinary length of flap, but leave a tendon flap when operating near the epiphyseal line as that is where the bones naturally grow in length. If operating here it is necessary to make long flaps.

The position of fragments of the thigh is interesting also and illustrates the plan of treatment which is now becoming so generally in vogue, that we should always make the lines of fragments come into position not by pressure but by apposition of the lower or loose fragment. If we cannot bring the upper fragment in line with the lower fragment, bring the lower fragment in line with the upper fragment. I am afraid of applying pressure in a fracture case where the soft parts are injured. I doubt the advisability of it, and I think it can be obviated in nearly every instance by proper position of the lower limb. The position of the lower part of the fragment should always be in line with the upper fragment. If the fracture has occurred in the middle of the thigh this can be easily done, but if in the lower part of the thigh we use the inclined plane.

As to stiffness of joints, the condition likely to occur after fixation of the limb, if experiments in this line can be substantiated, namely joints in which there is absolutely no injury done to them, do not become stiff by prolonged fixation in one position. I know this is contrary to our accepted beliefs, but experiments have positively demonstrated it. I recall two series of experiments which conclusively demonstrated this point, and after two or three months fixation of the

normal joint there was absolutely no ankylosis. There is some stiffness, it is true, the same as that which we would get from any part being held in one position for a certain length of time, but that condition limbers up by a little massage. On the other hand, where a joint has been injured to some extent, fixation is liable to result in more or less ankylosis.

I am exceedingly glad to have had the opportunity of hearing Dr. Fairbrother's admirable paper, and I wish to compliment him on it.

DR. C. B. HORRELL, Colchester: In line with the topic under consideration, I will say that I was talking yesterday with so eminent an authority as Dr. Caldwell, of Freeport, who is one of the older members of the Society, and in the matter of dressing he made the assertion that for the majority of fractures he never uses any splints. In the demonstration that we have had before us to-day by Dr. Fairbrother, it seems to me that it would increase my skepticism with reference to that theory, which is not of course original with Dr. Caldwell. He never, in a Colles' fracture, or in a fracture of the lower extremity, rarely in the elbow, uses a splint, but employs massage.

DR. J. O. DECOURCY, St. Libory: There are reasons for using bandages, and there are reasons for not using them. In fractures of bones adjacent to joints it seems to me the principal object of a bandage is that when the fracture has been reduced and immobility established, to maintain the fragments in absolute apposition by rest of the part. We had this beautifully illustrated in one of the specimens passed around of a bone that was left without any bandage, which was in constant motion, in a vibratory condition, so to speak, as the chicken was going from place to place. We had a modification in the other instance where there was better union by maintaining the parts in coaptation by a bandage. If the fracture is of such a nature and the condition of the patient, physically as well as mentally, is good, coaptation of the parts and their maintenance by a bandage in many cases is not necessary, or at least in some cases. Practical experience has taught surgeons these conditions are rare, and that to get good results in cases of fracture the parts must be kept at rest. It will consume too much of our time to go into the *modus operandi* of nature in throwing out bony tissue, and it is a phase of the subject of too great a depth to undertake now.

With reference to shortening or deformity, it will largely depend upon the nature of the fracture. If we have a transverse fracture and the fragments are coaptated and kept in a condition of immobility, there will be very little enlargement or throwing out of callus. If the frac-

ture be longitudinal or diagonal there will be an additional amount of callus or bone growth thrown out in that direction, and hence we may have enlargement or shortening of the limb.

Dr. Fairbrother (closing the discussion): With regard to the part played by the periosteum in the formation of bone, of course no one will deny that it is an important factor in this respect, and that bone repair will go on in many cases by the aid of the periosteum where it will not go on without it. This is well illustrated in resections of the fibula. If you take the periosteum out you will not have any regrowth, but by leaving it in we may have several inches of regrowth, or an inch or two anyway. I would not admit that the periosteum is the most important factor in bone repair, but would be inclined to hold that a deposit of callus is thrown out from the vascular system in the neighborhood where the fracture is located; that the blood contains all the elements of every tissue and there is deposited at the point of irritation the particular tissue needed. Where there is irritation there is a flaw, and that flaw will have impressed upon it the stamp of the tissue to be repaired. If the tissue to be repaired should be cartilage, then there will be deposited in that neighborhood cartilage cells; but if it be the repair of bone we have a deposit, not only of cartilage, but of earthy salt. The argument has been advanced that an irritation of the periosteum is unnecessary to growth of bone. That the growth of bone may take place by metabolism in any tissue of the body, and I noticed in a case reported from the St. Louis City Hospital there was a bony slab formed in the outer posterior part of the thigh three inches wide, about one-half inch thick, by a foot long. The man entered the hospital with stiffness of the thigh and with a history of bloody tumor in the thigh several years before caused by receiving a kick. In a few years' time that was transformed into this hard substance. Upon cutting down upon it after chloroform anesthesia the surgeon dissected it out and found what I have described. It had no connection with the periosteum, nor was there any history of irritation of bone. One of the gentlemen spoke of the irritation of the periosteum as being generally considered necessary to the formation of bone, but there are many cases such as the one I speak of where bone is formed without irritation of the periosteum. There are cases in which tumors have gone through a process of calcification into that of true bone. And so we may be forced to admit through this mysterious process of metabolism that any or all of the tissues of the body may surrender to the process of ossification. I saw some years ago in a museum a pitiful object, called the ossified man. To the touch he seemed in every way like a man frozen, except the skin was soft and slightly movable. I could not say whether the calcifying process had

gone on to complete bony structure or not, but he had symptoms to the effect that this hard substance was bony structure. Thus we might say that bone will develop independent of irritation, and simply by the act of metabolism a certain impress of the nervous system is made on the lymph deposit or on certain tissue, changing it into bone, and a man may become hard hearted physically.

With regard to Dr. Corr's statement in reference to a paper read by Dr. Hamilton, this paper started to do an immense amount of damage to the profession all over the country. His assertion, that there should not be any shortening after a fracture, was met by positive denial by the profession everywhere, because shortening or deformity is the rule, and there is no prominent surgeon but what takes that view of fractures. If the doctrine of no shortening following fractures was promulgated, it would result in many lawsuits.

With regard to the inquiry of the gentleman (Dr. Horrell) as to treating fractures without splints, I know that has been advocated for some time. I remember thirty years ago Dr. Hodgen of St. Louis took up the treatment of fractures of the spine without splints and in the same way treated other fractures, but personally I have had no experience in the matter. I have never felt like resorting to it.

A PLEA FOR THE EARLY OPERATION FOR LACERATIONS OF THE CERVIX UTERI.

BY JOSEPH B. BACON, M. D., CHICAGO.

Lacerations of the cervix uteri have been recognized and their resulting pathological consequences scientifically noted only since about 1862. Emmet was the first gynecologist to recognize the fact that a laceration of the cervix was the cause of the erosions, eversions, etc., which previous to his discovery had been treated and described as ulcerations of the neck of the womb. Too much praise cannot be given to this great American gynecologist for his thirty-five years of painstaking and scientific work in bringing this very important subject before the profession, and devising an operation that has been the means of curing a large per cent. of these cases when properly done in selected cases. So much has been written about the symptoms and cure of lacerations of the cervix during the past generation that we forget the subject is scientifically a new one. Like most newly discovered important subjects it has been greatly abused by over-enthusiastic writers and operators. Even Emmet has been severely criticised for his enthusiastic utterances about the symptoms that result from a laceration and the marvelous results that follow an operation for the correction of the same. He goes so far as to say that the importance of this injury cannot be exaggerated, since one-half of all the ailments of those who have borne children are due to this. When we carefully read the history of his reported cases we are compelled to think that he has

just ground for making such an emphatic statement. If one who is not a doubting Thomas will but review the literature that has been written upon this subject for the past twenty years, he will find assertions of symptoms that have been cured by trachelorrhaphy until he will believe that this one operative procedure will cure almost any ache, pain or disease to which a woman is subject. But fortunately most of us are distantly related to that historic individual and are subject to doubting; especially, since of recent years we have come in direct contact with a class of medical men that designate themselves as specialists, and have embarked in this narrow special line without any previous experience in the broad field of general medicine and surgery. Admitting that over enthusiastic specialists, both capable and incapable operators, have given the subject too much prominence in accounting for the ailments of women, and also admitting that the critics of Emmet's writings may be partially correct in their opinions, we must acknowledge that lacerations of the cervix cause many serious conditions, both local and general, that produce ill health and suffering in women. We are therefore bound to investigate the conditions and try to prevent the serious results that follow this injury. So much has been written, and the subject has been so frequently discussed, that it would be unkind of me to ask your attention to the causes of laceration or the method of prevention, or to discuss the means of operation, or to relate the history of cases with symptoms, or to try and describe some new method of operative procedure. I think we all agree that the Emmet operation in selected cases, and the Schrœder operation in selected cases, are all that could be desired, and that the work performed by the general practitioner or surgeon, as well as that of the gynecologist, is as well done as surgical repair of other organs. But all gynecologists are aware that the medical men have not, as a whole,

given enough attention and thought to the pathological conditions that follow frequently after a severe laceration of the cervix, and the importance of recognizing and relieving these conditions before they have reached a stage where only a partial relief is possible by an operative procedure or method of treatment that will conserve the uterus. With this idea in view I ask the privilege of reading this paper before your Society. I have no new pathological law to add to those already incorporated in the scientific history of uterine diseases, but I desire to present a new adaptation of pathological facts, as recognized in the disease affecting non-striped muscles and fibrous tissues in other organs, and show how like conditions may help to cause some of the serious results we find in neglected cases of severe lacerations of the cervix. Lacerations of the cervix are so frequent at child-birth that many authorities consider them as almost physiological, and as most of these lacerations readily heal and leave no bad results, the tendency is among the general practitioner to pay no attention to them until the subjective symptoms become so annoying that the woman calls for relief from pelvic pain, leucorrhea and various reflex neuroses, etc. For these symptoms and relief of eversions, erosions, and tender cicatricial tissue of the cervix and external os, hystero-trachelorrhaphy and curettage is done. Many of the symptoms, together with the diseased conditions of the vaginal portion of the cervix, are cured by the operation. Many of these cases become restored to health and comfort by this single operation, or by a combination of operations when the uterine adnexa are diseased in connection with the cervix. But unfortunately there is quite a percentage of cases that neither the Emmet nor Schrœder operation can cure. Both these authors have published such results. Emmet states that he cured some by a second operation where he removed a part of the cicatricial

tissue that was left when operating the first time. The fact that he devised a spear-pointed needle to sew the flaps together, because, as he stated, the tissue was too hard to use an ordinary needle, proves that he could not remove all the cicatricial tissue in some cases. After reading Emmet's report of cases and his painstaking and scientific method of operating and description of the pathological changes that follow often after a laceration, and his reasons for removal, if possible, of all the cicatricial tissue, I ceased using the Skene hawk-bill scissors for cutting out the wedge-shaped piece in the angles and adopted a method of dissecting away the cicatricial tissue with a blunt-pointed pair of scissors, taking all the scar tissue from each angle in one piece. This succeeded in mild cases, but when I tried the method in old neglected cases, where the tear extended up the full length of the vaginal portion and the infection had produced hyperplasia of fibrous tissue of both lips and the whole cervix, with erosion and eversion, etc., I found that in trying to dissect away the scar tissue that it was in many cases impossible, that it extended up to and in some cases beyond the internal os and formed a tubular cicatrix of the upper cervical canal and internal os, with the cicatricial stricture at the inner os so dense that it had ceased to be a muscular sphincter and was not dilatable like a muscle, but could only be divulsed as a stricture. Seeing this in several cases convinced me why many cases were not cured by trachelorrhaphy, but only relieved from a part of their symptoms. They had been neglected too long and no operation, even the so-called amputation of the cervix, could remove the diseased tissue. Had these cases been treated by intra-uterine application of electricity or by other cautery, I could in a measure have accounted for the condition, but they had not been so treated and some of them had never had any local treatment. The chief causes that prevent a cervix repair

from uniting are, according to Schrœder, due to previous catarrhal conditions of the cervical mucous membrane, so that it protrudes between the torn surfaces and prevents union. Next comes infection of the tear, causing an ulcer that must heal by a granulation. Extensive tears through the vaginal portion of the cervix do not have time to heal firmly before the woman assumes the upright position, usually at the end of two weeks, when the posterior lip pressing upon the vaginal wall re-opens the wound and necessitates a new process of granulation to take place with the resulting cicatrix. When a scar is formed that is irritable from pressing upon tender nerve filaments, or an infection of the cervical mucous membrane and cervical connective tissue and muscle has once developed, the serious results begin immediately and do not terminate, unless repaired, for an indefinite time.

Harrison Cripps, (Diseases of the Rectum, p. 221), in speaking of the causes of fibrous strictures states that there are two pathological conditions in which he believes this condition originates. 1. The tendency of fibrous tissue subjected to chronic inflammation to become both hypertrophied and contracted. 2. The tendency of muscular fibres, when subjected to undue and persistent nerve irritation, to undergo fibroid degeneration, with permanent atrophic contraction of its fibrous elements.

We have practically the same anatomical make-up in the cervix uteri that we find in the rectum: a mucous membrane composed of glands that are lined by columnar epithelial cells, with the basement membrane of reticular tissue, lying direct upon a coat of unstriped muscles that have the same nerve supply as the rectum, both sympathetic and spinal. These cervical mucous glands are readily infected and have a tendency to become chronically diseased similarly to the Lieberkühn glands of the rectum. There is a like inter-glandular

lymph space and blood supply, both draining through inter-muscular spaces filled with abundant and excessive fibrous connective tissue. The racemose glands of the cervix are susceptible especially to chronic infection, and many of the glands become totally destroyed, others only in part, and atrophying leave a part of the gland remaining to cause retention cysts and chronic inflammatory areas of irritation. We have here then just the conditions to produce, according to these pathological laws of Cripps, the excessive cicatricial destruction we find in neglected cases, and a fibroid change of the adjacent muscles, and especially the sphincter bundle of muscles found at the internal os. Infection of such tissues is almost sure to become chronic. The anatomical make-up of the cervical glands makes it impossible to cleanse them from infection. Once chronic there is no limit to the destructive changes that may take place in the cervix and later involving the tissues of the body of the organ. The chronic glandular and interstitial inflammation causes a hyperplasia of the fibrous tissue adjacent with inevitable contraction later on. This contracted fibrous tissue may sever the mucous glands, producing a retention cyst. The contraction of the inter-muscular spaces presses upon the nerves and irritates the muscles adjacent, producing spasm of these muscle fibres. When the muscle is stimulated to a point incompatible with life it atrophies and is then replaced by fibrous tissue. This newly added fibrous tissue together with that previously formed produces a real stricture of the cervical canal, and at the inner os, where there is excessive sphincter muscle to undergo degeneration, we eventually find in neglected cases the greatest amount of cicatricial tissue.

When we come to add to these pathological conditions the fact that there is a great tendency in those unrepaired cervical tears to become the seat of a malignant growth or endome-

tritis, metritis, with even salpingitis, or that the condition may cause sub-involution and displacements, together with the important fact shown by Emmet that a very large per cent. of unrepaired lacerations produce sterility and cause miscarriages. Taking all these facts into consideration, has Emmet exaggerated the importance of the repair of this wound?

If it proves permissible to apply the pathological laws of Cripps as he applied them in rectal strictures in accounting for some of the serious pathological conditions found in neglected cases of cervical tears, where the conditions are incurable, then we can more readily see the supreme importance of early detection and repairing this injury. When the tear is extensive, involving the whole vaginal portion of the cervix, it should be united by catgut sutures at once, and the woman kept in the recumbent position for at least three or four weeks. In all cases following child-birth the cervix should be inspected before the woman is permitted to leave her bed, and if a laceration that was too insignificant to be felt at the time of labor is now seen to exist, it must be inspected from time to time, and if by local cleansing it does not become covered with squamous epithelium or a non-irritating cicatrix, and the surrounding cervical tissue shows evidence of infection, curettage and repair of the cervix is imperative, unless some pelvic complication contra-indicated operative procedure for the time being.

Condition of mother or child may necessitate postponement of operation until cessation of lactation, but this should be the limit under ordinary circumstances.

DISCUSSION.

Dr. Emory Lanphear, St. Louis, Mo., (by invitation): I do not know that I can accept the author's application of Mr. Harrison Cripps' ideas of rectal pathology to the pathological conditions which we find in the cervix, but in most of the other points of the paper my experience fully coincides with the observations made by the distin-

guished author. There can be no question but that the Emmet operation has been abused. There are to-day men, crazy over the so-called orifical philosophy, who operate upon insignificant lacerations of the cervix. The lacerations, which Dr. Bacon has designated as physiological lacerations heal readily and leave no irritable cicatrix. On the other hand, there can be no question that the Emmet operation has been neglected in the severe cases of laceration of the cervix. There are at the present time, in spite of the knowledge which we possess of the advantages of the Emmet operation, countless numbers of women going about the country with severe pathological conditions in the cervix, which are not only the cause of sterility and of their present discomfort, but are a menace to their future happiness and future life.

I am glad he called attention to one peculiar feature which has hitherto, I believe, not been mentioned, that is, oftentimes the tear extends farther up than it appears at the first glance. I believe that in many instances operation has been performed and has given no good result because a lot of cicatricial tissue at the os internum, or above, has been left, keeping up the irritation of the nervous system, and also keeping up the discharge which the operation sought to relieve.

I understood him also to say, that we can obtain only partial relief when these operations are done late. He has made a strong plea for early operation, but I do not believe that it is correct in the majority of cases, as there may be instances in which a late operation does afford relief, but howsoever late the cervical tear may be, it should be repaired. This is true of the cosmetic part in gynecological practice. The chief reason, however, which induces me to urge early operation in every case of lacerated cervix is the danger of malignancy. No matter what opponents may say with regard to this measure, my practice most emphatically is in favor of the belief that traumatism of the cervix is a very strong predisposing factor in the production of malignant disease of the uterus.

Dr. Emil Ries, Chicago: I wish to say a few words in connection with Dr. Bacon's paper, and in the first place to emphasize the importance of early operation in lacerations of the cervix. I believe that these lacerations should be repaired as soon after their occurrence as possible. I refer now to extensive tears of the cervix extending near the uterine artery and veins, and which cause considerable hemorrhage and too often are the cause of death of patients. These unfavorable results can be avoided by early operation. If there is hemorrhage after delivery of the child and the removal of the placenta, and it does not show a disposition to stop, the proper thing to do is to thoroughly

inspect the cervix to determine if there be a tear present or not, and if a laceration exists, the proper thing to do is to close it by an operation. It does not take much work to do that. I have operated on a number of cases of lacerations of the cervix, and although the hemorrhage was quite profuse in some cases I have controlled it by suture. Hemorrhage, I think, is a more important indication for the repair of a laceration of the cervix than any other one thing.

DR. BACON (closing the discussion): A good deal of the discussion shows that the gentlemen who have spoken lost sight of my object in reading this paper. One of the points I desired to make was that our ideas of rectal pathology could be applied to pathological conditions of the cervix uteri. Cripps, whom I quoted, is an excellent man; he stands very high in the profession as an original thinker and worker. After preparing and before presenting my paper to the Society, I submitted my ideas to two well known pathologists in Chicago—Drs. Hektön and Harvey—and they discussed the subject in all its bearings with me. The laws of pathology applicable to the enormous amount of fibrous tissue which takes place in the rectum can be applied to those conditions encountered in the incurable cases of badly lacerated cervices.

One of the principal points in my paper was to call attention to the fact that surgeons neglected the repair of lacerations of the cervix uteri until they were incurable.

PLASTIC OPERATIONS ON THE TUBES.

BY EMIL RIES, M. D., CHICAGO.

The conviction that too many tubes have been removed and are being removed every day is gaining more and more ground among scientific gynecologists. The consequence is that methods which permit removing the products of disease without removing the diseased organ are coming into widespread use after they have long been disregarded or even derided. These methods are the plastic operations on the tubes.

The normal tubes are the excretory ducts of the ovaries—nothing more, nothing less—and a number of pathological processes disturb this function to a degree which even at the present time induces many surgeons to remove such organs rather than to try plastic operations.

In my opinion the indications for plastic operations on the tubes are given by obstruction of the tubal channel in consequence of one or more of three different processes :

1. Benignant tumors, more particularly the adenomyomas of the tube.

2. Extra-uterine pregnancy in certain cases.

3. Inflammation in cases where there is no pus or other signs of an active stage of the inflammation.

The occlusions may be located at the abdominal or at the uterine end, or especially, in cases of tumor or tubal pregnancy, in any part of the tube. The tubes may be occluded without becoming much distended. I have repeatedly found

the abdominal end of both tubes occluded and the tubes no larger than the little finger. In other cases, however, there is considerable enlargement, especially in tubal pregnancy.

The diagnosis of the tubal occlusion may be difficult and uncertain. A surmise, a suspicion is sometimes all that can be gained by bimanual palpation where extensive adhesions of the appendages or retroversion with adhesions and a history of sterility coincide. Sterility in these cases is often what is called one-child sterility, that is to say, sterility existing after the birth of one child where usually the childbed has been complicated by some inflammatory affection due in most cases to gonorrhœic infection acquired at the same time with the pregnancy. The diagnosis of the occlusion is frequently not to be made until in the course of an operation undertaken with the purpose of treating an adherent retroflexion, etc.

The methods most frequently used in these operations are Skutsch's salpingostomy and the resection of the tube as advised by Martin of Berlin. The latter also performed salpingostomy. Salpingostomy consists in cutting a window into the occluded tube and sewing serosa to mucosa so as to prevent new agglutination. The new opening of the tube can then be sutured to the ovary if this is thought desirable. Gersuny of Vienna tried to make the communication of ovary and tube absolutely reliable by turning the ovary into the artificial opening of the tube and retaining it there by sutures. Martin recommends the resection of the occluded abdominal end and seaming of the stump with or without suturing the tube to the ovary. With all of these methods the desired result of a pregnancy has been accomplished. I have myself performed salpingostomy and resection of the tube in about twenty cases. The patients have recovered from their operations without any difficulty, but so far no pregnancy has been reported to me.

The opportunity for salpingostomy is always given where an old inflammatory process has produced occlusion of the abdominal end without destroying the mucous membrane of the tube to a large extent or leaving behind pus in or near the tube. The resection of the tube I have also practiced in extra-uterine pregnancy where the ovum had developed in the abdominal part of the tube. But it seems to me that there is another way of dealing with a tubal pregnancy, if this should be developed in the middle portion, the pars isthmica of the tube—I mean the incision of the tube with enucleation of the tubal pregnancy, a method especially feasible where we have to deal with a tubal mole. Even a small perforation of the tube need not necessarily force us to do a mutilating operation; the tube can be sutured after the enucleation and the opening of the perforation can be included in the suture of the incision.

Occlusion at the uterine end of the tube is produced quite frequently by small adenomyomas of the tube, but there is only one case on record where an operation was performed for such an occlusion. This operation was performed by Dr. T. J. Watkins of Chicago, and I gave the first short notice of it in my paper on nodular forms of tubal disease (Journal Exp. Med., 1897). This operation practically amounts to an end-to-end anastomosis between tube and uterus, a salpingo-hystero-anastomosis. It was performed so that the myomatous nodule was excised by a wedge-shaped incision reaching down into the cavity of the uterus, the tube then being implanted into this opening and retained by sutures. The appendages of the other side had been removed on account of pyosalpinx. The patient miscarried a number of months after the operation, proving thereby that the salpingo-hystero-anastomosis had kept patent the communication between tube and uterus.

Artificial abdominal orifices have a very great tendency to remain patulous; in fact this tendency is so marked that it is the cause of many difficulties where it is not desirable to have a tube patent. I had the good fortune to observe three cases where the appendages of one or both sides had been removed for some reason by three different operators, and where months or years afterwards the uterus had to be removed. In all of these three cases the tubal stumps were found patulous (see Am. Gyn. and Obst. Journ., January, 1898). I need not dwell here on the importance of this observation with regard to the formation of that very troublesome and very frequent disturbance in the recovery of our patients after salpingectomy with the usual technique the stump exudates, but refer to my paper just mentioned.

The tendency of the tube to remain patulous in spite of its being severed or even ligated has aroused considerable interest since operations have been undertaken with a view to bringing about sterility by cutting and ligating the tubes. Kehrer of Heidelberg (Centralbl. f. Gyn., 1897) was the first to propose this operation as systematical treatment of cases in which pregnancy would endanger the life of the patient, as for instance in women who have had to undergo Cæsarian section for contracted pelvis, etc. The operation has been performed before Kehrer by a number of men, among them myself. In the course of a Cæsarian section for osteomalacic pelvis, I severed and ligated both tubes at the request of the patient, who did not wish to expose herself to the danger of another Cæsarian section. As long as I could keep track of the patient she did not become pregnant again. This, however, has not been the general experience. Fritsch, for instance, (Centralbl. f. Gyn., 1897), reports a case where he had cut and ligated the tubes in order to bring about sterility,

but the patient conceived, nevertheless, and gave birth to a child at full term. The American literature contains three cases where, after apparently complete removal of the tubes, pregnancy occurred and went to full term. These cases are incomprehensible if we do not know that in spite of cutting and ligating the tubes they may remain patent. The only actual observations of this surprising condition are so far those which I have described in the American Gynecological Journal.

Kehrer's recommendation of this operation of cutting and ligating the tubes was given with the additional direction of performing it by vaginal cœliotomy, as this is a very much easier method for the patient than ventral incision. Probably many of us would hesitate to recommend this sterilizing operation if we had to perform it by ventral incision, as this route involves so much greater discomfort, longer confinement to bed and greater danger cf infection, wound-suppuration and ventral hernia. It is easy to reach the tubes by vaginal cœliotomy, and I have myself performed about twenty salpingostomies by the vaginal route without any untoward effects on the patients. In the same way artificial occlusion of the tubes can be brought about, the patient not being confined to bed for more than about one week. But with regard to the observations made on the tubal stumps after salpingectomy, as quoted above, I must say that it is not sufficient to cut and ligate the tubes to bring about sterility. It is necessary to produce firm occlusion, and this we know is not always assured by a mere ligature. The most reliable way of producing it is to excise a wedge-shaped piece from the uterine horn and then to suture so that the muscular walls of the uterus are brought together, forming a thick barrier. This operation can easily be performed by vaginal cœliotomy.

DISCUSSION.

DR. EMORY LANPHEAR, St. Louis, Mo. There is one point in regard to the occlusion of the uterine end of the tube which I think might be mentioned, and that is, I have found it unnecessary to make the V-shaped incision of which the Doctor speaks, because I believe I have secured equally good results in following the same method which we follow in operating upon the appendix. That is, I cut the tube just as closely as possible to the uterus in such a way that it is not difficult to bring the serous surfaces together with a continuous silk stitch, burying it by normal covering of the uterus and the broad ligament. Before applying a ligature to the uterine end of the tube I simply encircle the tube and push down a little bit of the peritoneum, enough so that when the tube is cut the cat-gut ligature which I throw around the tube is buried. In that way I am sure the opening into the uterus is completely closed. I see no reason to make any change in this method. It is much simpler than the other, and is equally satisfactory. Most surgeons have adopted the same plan. Formerly, in order to obtain occlusion we burned with the actual cautery, or many of us with carbolic acid. This, of course, left a slough which was objectionable, and on account of that I adopted this plan of burying the suture, just the same as we bury the stump of the appendix, and it satisfactorily closes the tube, and, as I have said, is much more simple than the other method.

DR. WILLIS: I would like to ask Dr. Ries if he thinks portions of a tube and ovary can be transplanted and functionation go on?

DR. RIES (closing the discussion): In answer to the question of Dr. Willis, I will say that ovaries have been transplanted from one rabbit into another. I have removed both ovaries from one rabbit and transplanted them into the peritoneal cavity of another rabbit, and in a number of the cases the ovaries have become atrophied completely. In another series of cases ovulation went on undisturbed, and in a recent experiment conducted in Vienna pregnancy took place. There is no question about this being possible in the animal, but how far it will be successful in the human being I do not know.

It is my practice not to operate on a woman unless she really needs it. I do not operate for sterility alone unless I am absolutely sure the busband is not sterile.

THE TREATMENT OF SEPTIC INFECTIONS FOLLOWING PIN-PRICKS, ABRASIONS AND SIMILAR INJURIES.

BY EDWARD H. OCHSNER, M. D., CHICAGO.

It is a well-known fact that the various pathogenic bacteria produce different manifestations when introduced into the same body in the same manner. The manifestations produced differ with the different species of pathogenic bacteria or with the varying virulence of the different members of the same species and with the susceptibility of the individual attacked.

Leaving names of species out of account and considering them only with reference to their virulence, we can clinically distinguish between four kinds of infections following pin-pricks, abrasions and similar injuries. Of course, there is no hard and fast line between the succeeding classes, one class slowly merging into the other.

UNDER CLASS 1, we may consider that form of infection which betrays itself by a marked local disturbance with the formation of pus at the point of infection, the systemic disturbance being relatively slight.

UNDER CLASS 2, that form in which there is marked local disturbance, with the formation of pus at the point of infection and with an ascending cellulitis, the systemic disturbance being usually more marked than in Class 1.

UNDER CLASS 3, that variety in which there is only slight disturbance locally, but in which there is an early and severe involvement of the regional lymph glands and severe general disturbance.

UNDER CLASS 4, that form in which there is no demonstrable local disturbance and only relatively little disturbance in the regional lymph glands, but in which there is severe general intoxication due to the presence of the pathogenic bacteria or their ptomaines in the blood.

It is hardly necessary to say that the infections become more and more serious in the order enumerated, the first class rarely becoming grave when properly treated from the onset, while the last class only too often terminates fatally, as the annual list of its victims in our own profession too clearly and sadly demonstrates. It is because of the distressing frequency with which our professional brethren suffer from these infections, and because of the unsatisfactory treatment to which I have seen them, as well as others, as a rule, subjected, that I have concluded to discuss the treatment of these forms of infection at some length.

In the first two classes the indications are plain and the treatment relatively simple. Elevation of the extremity at the very onset, copious wet dressing as described later, free incision and free drainage, just as soon as there is macroscopical evidence of pus. It is well in these cases to carefully apply an Esmarch constrictor to the limb, proximal to the inflamed area, before the incision is made. It is claimed, and I believe correctly, that the danger of disseminating the infection is greatly reduced if this precaution is observed, the theory being, that while the incisions are being made, it is best to compress the lymphatics and veins, thus closing them until thrombi have formed in their cut ends so as to prevent particles of infected material being taken up by either of these systems and disseminated through the body, thus furnishing foci for pyæmic abscesses, septic endocarditis or septicemia.

ONE OTHER CAUTION: The incision (or incisions) should be made wholly within the infested area—that is, they should

not pass beyond the line of demarkation, if such exists, as is usually the case, to a certain extent at least. By following these rules the pus can be evacuated with safety without opening up new areas to infection and the danger from the above mentioned complications or sequelæ is reduced to a minimum.

We now come to a consideration of the treatment that should be pursued in the third class of cases, namely, that class in which there is only slight disturbance locally but an early and severe involvement of the regional lymph glands and quite marked systemic disturbance. From purely theoretical considerations, I have always had the belief that the treatment generally followed for this class of cases, by even our most prominent and successful surgeons, is unsatisfactory and faulty. For the last four years I have consequently watched the treatment and the results obtained by our own, as well as foreign surgeons, and the more I see of it the more firmly do I become convinced that my first belief is the correct one. My attention was first called to this subject some four years ago, while house surgeon at the Cook County Hospital. At about the same time three of the twelve members of the resident staff were affected by this type of infection. Each one was treated by a different surgeon, in each the point of infection was freely incised; in one the axillary glands were removed; each one was incapacitated for work for some weeks, in fact they all had to leave the hospital for some time and had not completely recovered until some months after the infection first took place. I do not state this in order to reflect upon the surgeons in charge, for they were treated by three of the most prominent and successful surgeons of our city. It only set me to thinking on this subject. I knew that my ward patients were not having so serious a time with their infections, and I felt confident that the

treatment which my colleagues had received was not the most satisfactory that could have been instituted. I kept on observing and to a certain extent experimenting, especially with different dressings. While in Europe I noticed that surgeons and pathologists differed very markedly in their treatment of this class of infections acquired during surgical operations or necropsies. Most of the surgeons seemed to favor early and free incisions, while the pathologists had learned better. They are infected so frequently that they have learned to treat themselves much more satisfactorily than even the surgeons could. The quoting of a conversation, which took place in my presence, will bring this point out much more plainly and forcibly than anything which I might say on the subject. One day one of the surgical assistants came to the pathological laboratory with his arm in a dressing, suffused eyes, pyrexia, and considerable systemic disturbance. The director of the laboratory stepped up to him, asked him what had happened, and, after being told that he had an infected finger with enlargement of the lymph gland in the elbow and axilla, as well as a slight lymphangitis, said about the following: "Now, do not let the surgeons get at you; go to bed, put on a copious wet dressing and you will be well in a few days, while, if you let them lance it, you may be laid up for weeks; at best, you will not be able to resume your work for some days if you have a gash in your finger."

It is needless to say that I was pleased to hear my own position so forcibly stated by one whose judgment I value so highly as I do that of Dr. E. Fraenkel of Hamburg.

The sick assistant very wisely followed the advice and was back to work in less than a week. This he certainly could not have done with safety to himself or justice to his patients if he had an infected knife-wound in his finger, as he surely would have had had he permitted it to be lanced.

I will now briefly outline the treatment that I have used in a large number of cases, later giving my theoretical as well as practical reasons for this procedure.

I insist upon rest in bed, elevation of the infected extremity, free evacuation of the bowels by means of calomel and saline cathartics, not purging, simply free evacuation, that is, three to four bowel movements the first day, plenty of good, pure water, preferably presented at regular intervals so that the kidneys are able to properly perform their function. It is quite noticeable how much better patients do in hospitals, as well as in private practice, if they are given a definite quantity at definite intervals. They suffer less from headache, pyrexia and gastro-intestinal disturbances. To continue: liquid diet, avoidance of constriction to the lymphatic channels and blood vessels, avoidance of pressure upon the lymph glands, and finally, copious wet dressings. The dressings must be copious in order to be effective. It is in the way of putting on too small a wet dressing that many general practitioners and even surgeons often err. I heard a surgeon express this idea in a homely but nevertheless forcible way not long ago. He said: "None of your baby dressings."

I experimented for some time in order to determine the comfortable and effective wet dressing for these as well as other purposes.

Ever since the careful and painstaking work of Professor Roswell Park of Buffalo, surgeons have known and appreciated the value of boric acid as a germicide. Boric acid has, however, its disadvantages. It soon gets cold and then gives the patient a cold, clammy feeling, which ordinarily is very uncomfortable, and if there is severe sepsis, may be directly harmful. To obviate this, some surgeons have fresh hot solutions poured into the dressings at intervals of from thirty minutes to two hours. No matter how carefully the rubber dam

or rubber sheet has been adjusted, the bed is sure to get wet, which again is not only uncomfortable, but may be harmful.

Undoubtedly more than one patient treated by this method has awakened some morning with a severe cold, which does not favor rapid recovery. Besides it is expensive, both in labor and material, and even in hospitals one cannot be sure that it is punctually done, especially in large wards or at night when the patient is asleep.

Carbolic acid, varying in strength from one to four per cent., has been extensively used in these conditions. It has been repeatedly, and I believe satisfactorily, demonstrated that carbolic acid when thus employed is a very unsatisfactory antiseptic. Besides it has a deleterious effect upon the system, which fully balances and often outweighs any good result which it may produce locally. I refer to its effect upon the kidneys. No matter what we may do in order to counteract the disease, we must be sure not to impair the function of any of the excretory organs. These are our friends and allies and it would be folly to injure them. The one great value of carbolic acid in wet dressing is its action as a local anæsthetic.

Thanks to the work of Schimmelbush and others, an old but very reliable remedy has come into quite general use for this condition. I refer to alcohol. There is scarcely another non-poisonous germicide which is as effective as alcohol.

Alcohol also has the great advantage of keeping the part comfortably warm. The great objection to it is, that after a day or at most two days, its use often becomes painful and sometimes almost unbearable, and since, in these cases, it usually becomes necessary to apply a wet dressing for from two days to a week or even longer, it is scarcely advisable to apply a dressing which will make the part too sensitive.

There are a few other substances which have, from time to time, found favor with various surgeons as wet dressings, but

as most of them have been discarded because they did not fulfill first expectations, they scarcely need mention here.

Knowing the advantages, as well as disadvantages of boric acid, carbolic acid and alcohol, I set to work to combine them in proportions which would bring out their advantages as much as possible, without making manifest their disagreeable features. I experimented for some time trying to find out the best combination, both as to efficiency and comfort to the patient, and my final result is the following:

Boric acid sat. sol..... 6 parts
Carbolic acid 5 per cent. sol.....1 part
Alcohol 95 per cent.....1 part

This formula may sometimes be modified with advantage. If the part is not painful I often leave out the carbolic acid entirely. Again, some patients do better if the proportion of alcohol is increased.

The boric acid is put in because of its well known germicidal effect; the carbolic acid, because of its anæsthetic effect; the alcohol, because of its action as a germicide, and that it keeps the whole limb warm and comfortable. I use the plain sterile gauze for dressings by preference, because I believe it to be more effective and certainly more comfortable than cotton, and, as the same gauze can be used during the whole treatment of the case, which cannot be done with cotton, at least, not so readily, it is just about as cheap. I heat the solution on the stove instead of adding hot water, as is so often done when boric acid solution is used, for I have been fully convinced that the statement made by Frederick Treves is correct, that a saturated solution of boric acid is much more efficacious than an unsaturated one. Over the wet dressing a rubber protective should be applied to prevent too rapid evaporation, then some absorbent cotton to prevent dripping, and, finally, a soft roller bandage. The dressing as just described

will be comfortable and effective for from twelve to twenty-four hours. It is the least troublesome, least expensive, most comfortable and most effective wet dressing with which I have had any experience.

If the infection has come from a pin-prick or similar wound through a thick and calloused layer of the skin, it is advisable to carefully shave away the horny layer at the point of infection till one gets down to the quick, but one should avoid cutting into the healthy tissue. If, now, a little pus should form at the point, it will work its way to the surface and discharge spontaneously, or it can readily be released as soon as there is macroscopical evidence of pus.

Should softening of the affected lymph glands take place, a sequel which rarely occurs if the dressings have been properly and conscientiously applied from the very onset, they should be freely incised and drained with a gauze or rubber drain, but should not be enucleated, as whatever can be left may some day act as a barrier against general infection.

As to systemic medication in these cases, I must say that I have not a great deal of faith in it. Tonic doses of iron, quinine and strychnine, with or without the extract of malt, are indicated especially during the stage of convalescence. I can certainly not make myself believe that heroic doses of the tincture of the chloride of iron or of alcohol has ever done one of these cases any particular good.

The following are the theoretical reasons for believing that the conservative treatment just outlined is more rational than early free incision. The infective agent is usually introduced in minute quantities; it is virulent and is rapidly carried to the nearest lymph glands. Contrary to the contention of even very good surgeons, I am of the belief that the original point of infection soon ceases to play any important role in the progress of the disease if it is just left alone. The inflammatory

reaction at this point has nearly all subsided or will do so in a very short time. The leucocytes are rapidly getting the upper hand. The conditions become entirely changed, however, if the already injured part is now subjected to a new traumatism, as a cut for instance. Now the bacteria are again given a chance. The tissues, full of leucocytes which are killed, so to speak, by the incising knife, furnish an excellent culture media for the bacteria, which may not have been completely destroyed, the result is a rather profusely secreting, unwholesome looking, slowly healing ulcer. I have seen quite a number of these ulcers and have known it to take months to heal some of them.

My practical reason is, that I have seen and treated a goodly number of these cases now, some treated in one way and some in the other, and I can say without prejudice that the conservative treatment has been by far the more satisfactory.

In the fourth class of cases, those cases in which there is practically no reaction at the point of infection, where the glands are involved and where there is severe sepsis, the treatment should be practically the same as in class three. Even the most aggressive surgeons have given up incising the point of infection if there is no inflammatory reaction at all, but some still persist in taking out the involved lymph glands at the earliest possible moment. This I believe is a mistake and consider it best to use the wet dressings above described with supportative treatment and to incise the glands only when they show distinct evidence of suppuration, feeling confident that in this manner the progress of the disease can be most readily checked with the least possible discomfort and danger to the patient.

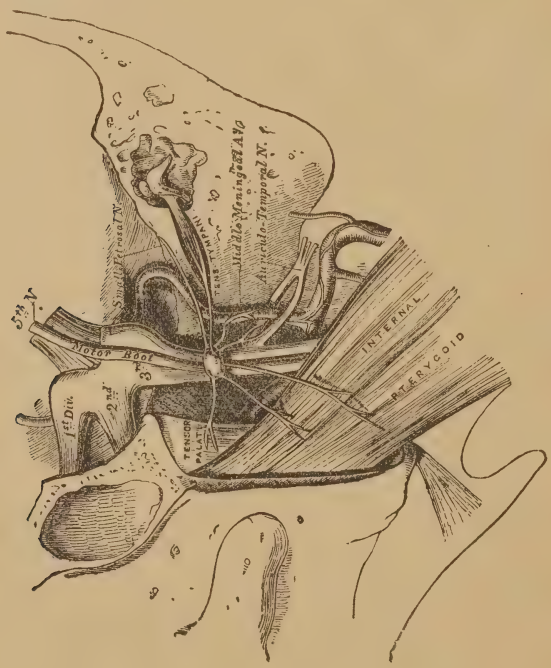
RELATION OF MIDDLE-EAR DISEASE TO FACIAL SPASM.

BY J. E. BEST, M. D., ARLINGTON HEIGHTS.

It has been my opportunity to see a few cases with the following history:

After severe exertion and exposure the patient complains of pain in the ear. This is followed, in a few days, by a discharge of pus, more or less profuse, from the aural cavity; simultaneous with this, or a few days later, may occur facial spasm.

The pathology may be better understood from a glance at the accompanying cut.



First, the abscess in the ear—germs enter, setting up inflammatory action along the auditory tract, with a fibro-plastic exudation encasing and compressing the sensitive nerve fibers from Arnold's ganglion, as shown in the cut.

These fibres supply the tensor tympani and tensor palati muscles, thus producing a reflex upon the third division of the fifth nerve which supplies the muscles of mastication and lower part of the face.

Etiology. Purely of germ origin.

Treatment. First treat the ear aseptically with peroxide of hydrogen, keeping it perfectly aseptic until all external trouble has healed. Allay pain during acute stage with morphia or other anodyne, used hypodermically, if need be.

Later. Facial spasm may be relieved by phenacetine gr. x, two, three or four times a day, as required. This has given more relief than any other drug I have tried.

If the case is of long standing or very obstinate, much benefit may be derived from the application of electro-cautery applied to the nasal mucous membrane as nearly as possible over the site of the above named ganglion. Repeat once in five or six days, after thoroughly cocainizing the mucous membrane. The latter drug also seems to have a curative effect upon the spasm.

HYDRAMNIOS.

Its Effect Upon Gestation and Labor.

BY ELIZA H. ROOT, M. D., CHICAGO.

Hydramnios and hydramnion are synonymous terms, used to designate an excess of amniotic fluid in the amniotic cavity. The first is used by the French, the second by the Germans. Some authors prefer polyhydramnios and polyhydramnion as more correct. Dropsy of the amnion is also used by good authorities. As dropsy, generally speaking, is but a symptom of the disease giving rise to it, it seems clear that the term as applied to hydramnios is equally appropriate.

The true source of the amniotic fluid is still a disputed question. The theory that the fluid is a secretion of the fœtal skin originated with Galen some sixteen hundred years ago. Drussing first taught that it was a secretion of the kidneys. Bohn taught that it was a secretion of the fœtal mammary glands; Lister that it came from the salivary glands; while Wharton, after whom the jelly of the cord is named, claimed that it came from the fœtal lachrymal glands and the jelly of the cord. The idea that the mammary, salivary or lachrymal glands take any part in the secretion of the amniotic fluid is worthy of notice, only to illustrate how folk-lore notions may and do enter into obstetrical science.

Galen's theory seems to have held with the system of medicine he founded, for it is not until late in the 18th century that the subject seems to have received renewed scientific thought.

In 1795 Bosch was the first to consider the amniotic fluid a product of the umbilical vessels. Sheel, in 1800, accepted his opinion and wrote in its defense.

In 1804 Lobstein taught that in man the amniotic fluid came from the uterus, but from the umbilical vessels in the lower animals.

In 1834 Bischoff advanced the theory of its being of maternal origin, reaching the amniotic cavity by a process of absorption, by means of the vascular layer between the chorion and the amnion. At this time, 1834, there were two distinct theories, each having its advocates and forming what the French are pleased to call schools. The first theory is that the amniotic fluid is a secretion of the fœtus and its envelopes. The second, that the amniotic fluid is of maternal origin only.

Sellinger was perhaps the leading defender of the first theory, holding that the fluid is derived exclusively from the circulation of the fœtus, from its skin by transudation in the first months of pregnancy, and later from the vessels of the cord and fœtal placenta. In 1851 Scherer, in an able thesis, defended the theory of its maternal origin.

About this time a third school was formed, with Virchow at its head, who taught that the fluid originated from both the maternal and fœtal tissues.

The normal quantity is also a matter of dispute, as it varies within the limits of health. Gassner found the average normal amount at the beginning of the seventh month to be 1⅝ lbs., at the beginning of the eighth month 2⅝ lbs., at beginning of the ninth month 3¼ lbs., and at term 3⅝ lbs.

These observations form a basis for the average normal amount given in our text books as ranging from 3 to 4 lbs. Charpentier holds the amount at two or three pounds, all over this he considers dropsy of the amnion.

Gassner has formulated a law as a basis for estimating a

normal amount: the amniotic fluid is proportionate to the weight of the fœtus and placenta. This is best applied to the last two or two and a half months of pregnancy, for prior to this time "the fœtus is freely movable," the fluid is out of proportion to the weight of the fœtus and placenta and the condition may not be considered abnormal.

Passing from the question of a normal amount to that which is abnormal, we enter upon a still more debatable ground. Authors do not agree upon what constitutes a veritable hydramnios. Winckel says "it is an excess of amniotic fluid in the amnion." Tarnier and Caseaux say: "Amniotic fluid may sometimes augment to a very considerable quantity, but as the normal amount is very variable, it is difficult to say above what limits it shall be considered as a disease; however, when it exceeds three or four pounds, the accumulation may be justly attributed to some morbid condition."

"Dropsy of the amnion, or hydramnion, is an excessive amount of fluid in the cavity, and is not uncommon. When it exists to a marked degree it will produce death of the fœtus, though the latter may have advanced to maturity." (Am. Text Book Obs.) All of which is very indefinite and leaves the individual observer free to form his own opinions without a true basis for them. As late as 1876 Guillemet says "it is of primary difficulty to determine the point at which the amniotic fluid becomes abnormal in amount. The *phenomena* attending it and the *results* must go far to determine the pathological degree." This, with Gassner's law, which simply means all fluid beyond the physiological needs of the fœtus and the uterus is abnormal, it seems to me furnishes the best data upon which the observer may base an opinion. The extremes given as excessive are five pounds as the minimum, and sixty pounds as a maximum amount, with an intermediate range, including the greatest number of cases, of ten to thirty pounds.

Sallinger in eighty-one cases found thirty pounds the largest amount. Schneider reports 24 lbs. and 60 lbs. Beaudaloque 13 to 32 pts. Statistics tell us the malady is rare, occurring once in 100 or 150 confinements, a statement I believe true only in cases of major degrees, and consequently misleading.

It is more frequent in twin pregnancies than in single pregnancies. The quantity is said to be doubled in twin pregnancies and the hydramnios may be more apparent than real. If each fœtus has its normal amount, we have in all four or six pounds, an abnormal amount for a single pregnancy. But can we so style it in the case of healthy twins? I think not, but if the same amount exists out of proportion to the individual needs of each fœtus, one having a greater amount than the other, the condition may be considered as pathological. Dr. Macier was first to teach that hydramnios was produced by inflammations of the amnion, and claims to have found several times false membranes on the fœtal surface of the amnion with the amnion itself highly injected. Other observers have never seen these conditions. Jungblut claims the discovery of a capillary net work of blood vessels lying in the superficial layer of the placenta next to the amnion. This net-work of vessels should be obliterated, normally by the middle of pregnancy, and Jungblut attributes the occurence of hydramnios to the continuance of these capillaries to term. Lebedjeu found this plexus in a case of hydramnios at term, with a dead child having aortic stenosis. Dr. Sallinger, with other observers, concludes, after making a series of experiments, that hydramnois is due to disturbed blood pressure, brought about by mechanical troubles in the fœtal circulation, or to the variations in the fœtal blood, and not to any special anatomy of the placenta. Winckel has never seen the capillary network of blood vessels described by Jungblut, but describes a system of lymphatic canaliculi opening upon the placental

surface of the amnion, similar to those found upon the diaphragm. The epithelial layer of the amnion is considered by some observers as a secreting layer that may produce hydramnios or oligo-hydramnios when diseased.

Several anomalies are found in connection with hydramnios and are thought by some to bear some relation to its causation. Mantel maintains there is a frequent and undeniable connection between insertion of the placenta in the lower segment of the uterus and hydramnios. He believes that when the placenta has such an insertion, the modifications in the umbilical cord determine, by obstruction to the natural course of the blood, a blood stasis, which increases osmosis into the amniotic cavity. Frankenhausen has observed in cases of hydramnios obstruction to the fœtal circulatlon in the liver. Causes on the side of the mother are given as hydremia, fibroid tumors of the uterus, cystic tumors of the ovary, cancer of the uterus and conditions causing ascites from any cause. It seems in a few cases to be due to sanguinous plethora and faulty action of the maternal heart.

Tarnier and Caseaux dismiss the subject by saying: "In the present state of our science it would be absolutely impossible to designate the causes of this singular affection." Charpentier concludes his able and exhaustive memoir on hydramnios, published in 1880, by saying, notwithstanding all the theories advanced, they are not sufficient, in face of other questions that arise, to account fully for the production of hydramnios; that conditions to which the affection is said to be due occur when there is no hydramnios, and states that certain incontestable facts exist in connection with the disease, for they have been found in a number of observations:

1. "Hydramnios coincides very frequently with multiple pregnancies." Oulment reports 14 cases, in which 7 were twins; Guillemet, 28 cases, 15 were twins; Sallinger, 81

cases, 31 multiple pragnancies, 28 twins, 1 triplets, and 1 quadruplets. In 100 cases observed by Bar only 11 were twins. In 10 cases of a major degree of my own, 5 were multiple pregnancies, 3 were twins, 1 triplets, 1 a double monster (ischiopagus.) Penny reports 1 case of triplets, with hydramnios. In 234 cases that I have collected, 69 were multiple pregnancies, 3 triplets, 1 quadruplets, and 65 twins, counting the ischiopagus a twin.

2. "That children born with the complication of hydramnios often present vices of development." Nearly if not quite all the deformities known to fœtal life are found connected with hydramnios. These deformities belong to two distinct orders: A, those due to arrested, or over-development, which again includes two sub-orders or classes: (a) single and (b) double monsters. B, those usually single, in which the departure from the normal is due to some true pathological changes, affecting the nutrition of formed material.

3. "A certain number of women affected by hydramnios are syphilitic and give birth to dead children or living children, presenting unmistakable traces of syphilis." There may be a history in the mother, the father, or in both parents. All authors observe a marked relation between syphilis and hydramnios. From my own experience, together with what I can gather from recently reported cases, hydramnios is more likely to occur in late syphilis of the mother than in early. As a causative factor in hydramnios it doubtless acts through the changes brought about in the blood, not only of the mother but of the fœtus, and not as syphilis *per se*, for the lower animals have hydramnios, but do not have syphilis.

Aside from and in conjunction with deformity and disease of the fœtus, accompanying hydramnios, various anomalies of the fœtal appendages are found. Of the cord: exaggerated tortion; excessive length; slender and weak cord; knots

simple and complex; short cord; short cord with diverticuli in which the umbilical vessels are so intimately twisted upon themselves it is impossible to separate them by dissection; (Maygrier, Paris, 1898;) cystic degeneration; stenosis of the umbilical vein at the ring; varices and large cord; membranes are thick and tough. In a syphilitic case of my own, delivered in April last, the membranes were very thick and tough, were difficult to rupture and the amnion and chorion were so intimately fused that it was impossible to separate them. The placenta was thick, friable, dark colored and peeled off the limiting membrane very easily. Other anomalies of the placenta found are atrophy, hypertrophy, myofibromata, œdema, cartalaginous and hepatic degenerations, infiltrations of the placental borders; placenta of great size, of small size and fatty degenerations. Dr. Bissel, of New York, recently reports fatty degeneration in the placenta of two successive pregnancies in a syphilitic woman, both complicated by hydramnios. Sub-amniotic cysts are also found.

The majority of our text books teach that hydramnios rarely appears before the fifth or sixth month of pregnancy, which I believe to be misleading and were better stated thus: The condition as a rule is not recognized before the fifth or sixth moth. There is sufficient evidence available to show that it occurs in the early months of pregnancy, terminating gestation by abortion. It may be a cause of habitual abortion in syphilitic or gonorrheal metritis or a metritis from any other infective cause.

Dr. Maygrier of Paris, in a recent report of a case, syphilitic, where the abdomen at two months was as large as it should be at four months, at term the abdomen was "enormous." A living child was born, pro-encephalic with hands and feet syndactile. The same physician reports a second case, also syphilitic, of a one-yelk twin pregnancy in which

hydramnios was marked in the fourth month, the patient's abdomen reaching the size of full term at the fifth month. Gestation was terminated at the sixth month, fourteen pints of fluid escaping. Dr. Carrie Lieberg of Idaho reports a case in which hydramnios occured in four successive pregnancies, two of which were terminated early in the fourth month, the villi and placental portion of the chorion destroyed. The disease may occur in retro-displacements of the uterus. In my own practice I have observed two cases. In both the uterus filled the hollow of the sacrum, the size was considerably in excess of the assumed age of the pregnancies, 2½ and 3 months respectively, and which was proved to be correct by subsequent events. In both cases the retroversion was attended by severe and uncontrollable vomiting; fever ranged from 102° F. to 104° F., pulse rapid and weak, no albumen in the urine, and loss of flesh was rapid and marked in both cases. On correction of the retroversion vomiting ceased and nutrition rapidly improved. In both cases the uterus did not increase in size to any considerable degree, arriving at the fifth month with normal size for the assumed age. Both were primipara and proceeded to full term without hydramnios. The children are still living and fairly healthy, though born debilitated and small, weighing five and six pounds respectively. There is no doubt in my mind that there was a beginning hydramnios in both cases that was arrested by the restoration of a normal pelvic circulation and improved maternal nutrition. There is reason to believe that a hydramnios may be preceded by an oligo-hydramnios. In a case with a syphilitic history reported by Dr. Maygrier, amniotic bands were found on the scalp of a hydro-cephalic fœtus corresponding to bands upon the fœtal surface of the placenta. Amniotic fluid was excessive in amount at term. It was the expressed opin-

ion of those taking part in the discussion that oligo-hydramnios preceded the hydramnios.

In twin pregnancies, hydramnios, one amnion and oligo-hydramnios of the other, may occur. Brem of Buda-Pesth reports a case in which one amnion was hydramnios and the fœtus normal, the other was oligo-hydramnios, the fœtus acardiacus. Hydramnios repeats itself in successive pregnancies, notably in Dr. Lieberg's case. Dr. Joseph Eve Allen of Augusta, Ga., reports 48 cases, saying that hydramnios repeatedly presented itself in the same individual and that in several there were unmistakable signs of syphilis.

There is perhaps no disease of the ovum so disastrous to fœtal life as hydramnios. It is said to be fatal in 25 per cent. of the cases. In the 100 cases reported by Bar 54 of the children were more or less healthy. Twenty-seven were still or died immediately after birth, and eight were monsters. The prognosis for the mother is much better, but depends greatly upon the amount of fluid, the extent of uterine distention and the rapidity of its accumulation. In relation to its effect upon the mother Charpentier divides the quantity constituting hydramnios into three degrees.

"In the first the quantity notably surpasses the normal amount, but its increase is not sudden. The discomfort attending it tends to increase of the malaise due to pregnancy, which continues to be more or less painful but does not compromise the mother's health." These cases go unnoticed many times, and it is not until the time of delivery the case is seen to be hydramnios. Anomalies of labor, notably the prolonged first and first half of the second stage occurs with occasional accidents to the fœtus without their true cause being recognized.

The second degree: "The fluid is more considerable, reaction of the uterus is more marked and serious. Outside of

the accidents due to hydramnios, premature contractions of the uterus determine rupture of the membranes and expulsion of the fœtus before the normal term of pregnancy, but the mother's life is not endangered;" while in the third degree he includes the extremes of hydramnios where intervention becomes necessary to save the life of the mother, and where differential diagnosis becomes difficult or impossible. The acute form he assigns to a fourth division, in which the symptoms and accidents are always severe and in proportion to the quantity of the fluid, uterine distention and the suddenness of the distention. This form is fortunately rare and always requires intervention in behalf of the mother's life.

Some of the symptoms associated with hydramnios are characteristic: There is more or less pain in the abdomen, hypogastric, inguinal, lumbar and sacral regions, and may occur in the intercostal regions. These pains are continuous or intermittent. Where pains are intermittent the uterus is often sensitive to a painful degree that makes palpation for diagnosis out of the question. The sensitiveness may be confined to the sides, front or fundus of the uterus. Patient is conscious of being oppressed for breath more or less continuously. Urine is scanty and high colored, or it may be abundant and pale. Constipation is a very constant symptom and diarrhœa is a frequent complication of the last term of pregnancy. Appetite is poor, there is more or less vomiting and loss of flesh.

All of these symptoms are more severe if the accumulation is rapid or occurs in the early months of pregnancy.

Swelling and puffiness of the hands, feet and limbs, without albumen or with only a slight trace in the urine, is a frequent uncomfortable condition. The heart's action is variable, ranging from 90 to 120. There is no rise of temperature as a rule. The patient cannot sleep well, is often unable to lie

down, being obliged to seek rest in a half-sitting position. The patient is usually nervous as a result of her many discomforts. She can take but little exercise for the same reason. There is little to be done by treatment. Elimination by the skin, kidneys and bowels must be well guarded. Such food should be allowed as the patient likes, and is easily digested. Strophanthus with nux vom. is an excellent support to the heart and relieves the kidneys.

Strychnine phosphate grs. 1-100 may be given a few days before labor to secure efficient contractions of the uterus, and as a prophylaxis against post-partum hemorrhage.

Diagnosis of hydramnios is of importance to the living child and to the mother, for the conduct and result of labor must depend largely upon a correct diagnosis.

By inspection we notice the increased size of the abdomen, being out of proportion to the assumed age of the pregnancy, the anterior prominence of the uterine tumor, supra-pubic œdema, which also exists in multiple pregnancy. The umbilical protrusion when present is not so transparent as in ascites. Palpation reveals a permanent tension of the uterine wall that imparts to the hand a feeling of tense elasticity. Uterine walls are thin, there is free mobility of the fœtus, resembling a condition that is considered normal during the sixth and part of the seventh months. The fœtus may change position spontaneously from time of one visit to the next. The movements of the fœtus may not be strongly felt or not felt at all by the palpating hands. On the other hand, the mother may mistake passive movements of a dead child for active fœtal movements. Ballotement is usually obtainable through the long and transverse axis of the uterus. This is more difficult to obtain if the fœtus is dead and macerated, and the uterine walls are less tense, as sometimes happens. The fluctuation wave in cases of the second and third degress of

hydramnios is present. In first degree cases the fluctuation wave is obtained only over that portion of the uterus in which the amniotic fluid lies. If external palpation is made during the moulding stage of the first stage of labor the fœtus, in first and in some second degree cases, will be found close to one or the other lateral uterine wall, usually on the right side, and the fluid occupying the other half or more of the uterine cavity, or the uterus itself lies at an acute angle to the axis of the pelvic inlet, preventing the engagement of the presenting pole of the fœtus. These deviations must be corrected before labor can progress. The heart sounds are dulled, or diffused nearly over the whole uterine tumor, if the uterine walls are tense. It is difficult to fix the point of greatest intensity; if heard it may readily shift its position and lead to an erroneous diagnosis of a twin pregnancy. The heart sounds are absent if the fœtus is dead and may be absent if the fœtus is small and feeble, is deformed or lies in an abnormal position.

Hydramnios may be mistaken for ascites, cystic ovarian tumor and must be differentiated from each. It may occur with ovarian tumor and ascites as its sequella, as in a case recently reported, and which was treated by an exploratory incision of the abdomen before a diagnosis of pregnancy with hydramnios was made.

Labor may come on at any time during gestation, caused by the death of the fœtus, by over distention of the uterus and by premature rupture of the membranes. With sudden rupture of the membranes and the cervix dilated sufficiently to let the fœtus pass, labor will be precipitate, causing more or less shock to the mother and inertia of the uterus producing post-partum hemorrhage. The child if feeble may be sacrificed by the sudden change in its surroundings or by its arrest at the pelvic inlet in a complex presentation, prolapse of the funis, etc. The first stage of labor is often delayed by the

tardy dilatation of the cervix, due to the over distention of the membranes or by their being adherent to the internal cervical ring and the formation of the amniotic pouch and its engagement within the cervix is thus prevented. Again delay takes place because the membranes are tough. The pouch of waters forms, dilates the cervix completely or nearly so when further advance ceases. The cervix becomes a swollen œdematous opposing ring, supported by beginning œdema of the upper vaginal walls. There can be no further progress until the waters escape by rupture of the membranes. If the arrest of progress continues, uterine contractions become ineffectual and more painful to the patient. The pouching membranes are no longer driven into the vagina with each pain as before, but they begin to recede and the pouch is gradually emptied. During this stage of arrest a complete change in the position and presentation of the fœtus may take place. The receding waters returning to the uterine cavity catch the presenting pole of the fœtus, carry it upward, allowing the upper pole to descend so that a transverse lie is produced. In cases affording less room for spontaneous turning a first lie (position) may be changed to a second, a second to a first and anterior positions of the presenting pole may be changed to posterior positions, and this too while the accoucher, who is not fully alive to what he has in hand, is waiting for "Nature" to rupture the membranes.

The continued ineffectual contractions, if severe, may also cause the thinned uterine walls to give way and a disastrous rupture take place into the abdominal cavity.

Symptoms of beginning uterine exhaustion may occur with the beginning of labor or after it has continued some hours, according to the strength of the patient, the amount of hydramnios and the condition of the uterine walls.

Ineffectual and anomalous pains are present so frequently in

cases of hydramnios, they should never fail of observation by the accoucher. Prompt and judicious interference is necessary, for the pains are not likely to become effectual. The mechanical and physiological forces are too entirely opposed to such a desirable result. Sudden escape of the amniotic fluid will cause complete uterine rest that will last from several hours to as many days. Interference at this time is imperative, if the fœtus is in a transverse lie, as it usually is, or otherwise presenting abnormally. If left to itself the uterus will retract down upon its contents and all the fluid will escape, when the necessary version becomes a very dangerous operation. In twin pregnancies the sudden delivery of the first fœtus with its fluid causes sometimes a transverse presentation of the second fœtus, which can be prevented only by the watchful alertness of the accoucher. Death of a feeble or premature fœtus may take place from the sudden shock imposed by the sudden loss of water and consequent change of position.

The first duty of the accoucher when he inserts the hand to do version is to determine if the child lives or not by examining the umbilical cord for pulsations.

The time when and the place where to rupture the membranes requires a nicety of judgment that well repays all care taken. The membranes may be ruptured high up in the uterus by means of a catheter or bogie so as to insure their gradual discharge, or by the fingers in an interval between pains with the hand held in position to prevent a too sudden down flow, while the other hand over the abdomen seeks to prevent, if possible, the fœtus from assuming an abnormal position, or if in a transverse, to assist the internal hand to convert it into a normal position. When the engagement of the presenting pole is effected further accident from the hydramnios is not likely to happen.

HISTORICAL.

The preliminary convention of physicians which met in Springfield June 4, 1850, resolved itself into the ILLINOIS STATE MEDICAL SOCIETY and adopted a constitution and by-laws with the following preamble and resolution:

WHEREAS, The Medical convention held in the city of Springfield in June, 1850, has declared it expedient "for the Medical convention of the State of Illinois to institute a State Medical Society," and

Inasmuch as an institution so conducted as to give frequent, united and emphatic expression to the views and aims of the medical profession in this State must at all times have a beneficial influence and supply more efficient means than has hitherto been available here for cultivating and advancing medical knowledge; for elevating the standard of medical education; for promoting the usefulness, honor and interests of the medical profession; for enlightening and directing public opinion in regard to the duties, responsibilities and requirements of medical men; for exciting and encouraging emulation and concert of action in the profession, and for facilitating and fostering friendly intercourse between those who are engaged in it; therefore,

Be it Resolved, In behalf of the Medical convention of the State of Illinois, that the members of the Medical convention held in Springfield in June, 1850, and all others who, in pursuit of the objects above mentioned, are to unite with or succeed them, constitute a State Medical Society; and that for the organization and management of the same, they adopt the following regulations.

CONSTITUTION.

ARTICLE I.—NAME.

This society shall be called THE ILLINOIS STATE MEDICAL SOCIETY.

ARTICLE II.—OBJECTS.

The objects are: The organization of the profession of the state for its united influence on questions pertaining to public charities, state asylums and other institutions, and on all questions of a medical, sanitary, charitable or educational nature, and the procuring of such legislation as will reflect the views and aims of the medical profession in relation thereto; and also to promote those scientific, social and professional interests for which medical societies are usually organized.

ARTICLE III.—MEMBERSHIP.

1. All regular resident members of the County and District Medical Societies within the State, organized in harmony with the spirit and objects of this Society, are eligible to membership.

2. They may become members at any time by furnishing the Treasurer or Permanent Secretary a certificate of membership and good standing in such local society, the certificate to be signed by the president and secretary thereof, and accompanied by one year's dues.

3. The names of new members shall be submitted to the Society at each annual meeting by the Committee on Registration, when any name, being objected to, may be dropped or referred to the Judicial Council, as the Society may direct.

4. When members lose their membership and good standing in their several local societies, they shall cease to be members of this Society.

5. Members failing to pay dues for three successive years, may be suspended and dropped from the roll by a majority vote of the Society.

6. Members shall be liable to censure, suspension or expulsion for unprofessional conduct.

7. *Life members* shall be those who have paid annual dues for twenty consecutive years, and such worthy members as the Society may des-

ignate by special vote on account of loss of health or other misfortune. They shall be exempt from the payment of annual dues, but shall have all the rights and privileges of others members.

Article IV.—Officers.

1. The officers of the Society shall be a President, a First Vice-President, a Second Vice-President, a Permanent Secretary, an Assistant Secretary, a Treasurer, nine Councillors to constitute the Judicial Council, and a Chairman and Secretary for each of the Sections.

2. The officers shall be elected annually, beginning their terms of office at the close of the meeting electing them; except the Permanent Secretary, who shall serve during the pleasure of the Society, and the Councillors, who shall each serve three years—three being elected each year. Each officer shall serve until his successor is elected.

Article V.—Duties of Officers.

1. The duties of the President shall be those usually pertaining to that office. He shall also give the annual address at the meeting over which he presides and shall be *ex-officio* Chairman of the Executive Committee.

2. The Vice-Presidents in their order shall perform such duties as generally pertain to the office of Vice-President. They shall also serve as an Auditing Committee, to whom the treasurer's annual report shall be referred for examination.

3. The Permanent Secretary shall, with the aid of a stenographer, make a faithful record of the proceedings of each meeting; conduct the official correspondence; notify members of the meetings, officers of their election, and committees of their appointment; preserve the archives of the Society; receive all matter intended for publication in the transactions, and discharge such other duties as pertain to his office. He shall be Chairman of the Committee on Publication, and as such shall superintend the publication and distribution of the annual transactions.

4. The Assistant Secretary shall aid the Permanent Secretary as may be required. He shall be a resident of the place where the Society meets. He shall be a member of the Committee of Arrangements and of the Committee on Registration.

5. The Treasurer shall have the custody of the funds, receive the dues of members, notify those in arrears at least twice each year—once immediately after, and once before each annual meeting; furnish an official list of members for the transactions, make an annual report which shall show the receipts and expenditures of the year ending with the day preceding the first day of the annual meeting, together

with the number of members, the number in arrears, the names of those liable to suspension under Section 5, Article III, and the number dropped from the roll during the year, and shall perform such other duties as pertain to his office. He shall, with the Assistant Secretary, be a Committee on Registration. He shall be a member of the Committee on Publication and to the other two members of this committee he shall give a bond for the safe keeping of the funds and the proper discharge of his trust. He shall disburse no funds of the Society except on the written endorsement of the President and Permanent Secretary.

6. The duties of the Judicial Council shall be to consider all questions of an ethical or personal character involving the rights or standing of members. Such questions shall be referred to the Council without discussion, and the decisions of the Council thereon shall be reported promptly to the Society, and shall be final, if previously so ordered. The Council shall also consider any other matters that may be referred to it by the Society and shall keep a permanent record of its proceedings.

Article VI.—Standing Committees.

1. The Standing Committees shall be:

The Executive Committee.
The Committee of Arrangements.
The Committee on Registration.
The Committee on Publication.
The Committee on Necrology.
The Committee on Legislation.
The Committee on Medical Societies.
The Committee on Society History.

Article VII.—Duties of Standing Committees.

1. The Executive Committee shall consist of the President, the Permanent Secretary, the Chairman of the Committee of Arrangements and the Chairman of each of the Sections. This Committee shall determine the character and scope of the scientific business and the order of the proceedings for each meeting, subject to any instructions of the Society or provisions of the by-laws, apportion the time as between the general sessions and the several Sections, and previous to each annual meeting, prepare a program of the scientific and other business to be followed by the Society and the Sections as nearly as practicable, which shall be issued by the Permanent Secretary.

2. The Committee of Arrangements shall consist of five members, including the Assistant Secretary. It shall be the duty of this com-

mittee to provide suitable accommodations for the meeting under the direction of the Executive Committee and in general to have charge of all the local and material interests of the meeting, not otherwise provided for.

3. The Committee on Registration, consisting of the Treasurer and Assistant Secretary *ex-officio*, shall record the names, the post office addresses, and the local societies of those members in attendance who have paid their dues for the current year. The list of names so registered shall be the official list for use of the Society during that meeting.

4. The Committee on Publication shall consist of the President, the Permanent Secretary and the Treasurer. The Permanent Secretary shall be Chairman of the Committee, who, jointly with the President, shall hold the Treasurer's official bond. The Committee shall have all the functions of a Finance Committee, and shall have charge of all matters relating to the publication of the transactions of the Society, with discretionary power to omit therefrom any paper, address or discussion, or any part thereof, on account of its length or want of preparation, or of a failure to receive copy or proof promptly.

5. The Committee on Necrology, consisting of three members, shall prepare for each meeting suitable biographical notices of deceased members.

6. The Committee on Legislation shall consist of three members, and the President *ex-officio*. The duties of this Committee shall be to watch the course of state legislation on medical subjects, to represent the Society in securing proposed legislation, to recommend to the Society for its endorsement proper subjects for legislation, and to report the status of pending or proposed measures.

7. The Committee on Medical Societies, consisting of three members, shall use means to promote a more complete organization of the profession of the state into county or district societies, and to establish reciprocal relations between them and this Society, and shall collect and report such a list and statistics of all local societies in affiliation with this Society as will be suitable for publication in the transactions,

This list, as revised and adopted from year to year, shall serve as an official guide for all purposes of the Society or any of its officers or committees.

8. The Committee on Society History shall be composed of such members of this Society as have so continued for forty or more years; also such as were members of this organization forty or more years prior to their admission to such committee by vote of this Society authorizing such admission. It shall be the duty of this committee to prepare and report one or more papers at each annual meeting relative

to matters of historic interest concerning this Society, its membership and proceedings and the early medical profession and practice within the State of Illinois.

9. All standing committees shall make an annual report in writing.

Article VIII.—Funds and Dues.

1. Funds shall be raised by the Society to accomplish the objects for which it is organized, and no appropriation shall be made for other purposes.

2. The annual dues of members shall be three dollars, except as otherwise provided, and shall be payable at the beginning of each meeting.

3. No member in arrears shall be entitled to receive the annual transactions.

4. No member or committee shall incur any pecuniary liability for the Society without a vote of the Society or the previous written approval of the Committee on Publication.

Article IX.—Amendments.

This Constitution may be changed at any annual meeting by three-fourths of the members present, provided notice of such proposed change shall have been given at the preceding meeting.

BY-LAWS.

ARTICLE I.—MEETINGS.

1. The Society shall meet annually on the *third* Tuesday of May and continue in session three days, or until the business of the meeting shall be completed.

2. The place of meeting shall be determined by vote of the Society.

3. The Executive Committee shall have power to change the time and place of meeting for cause.

4. Special meetings may be called by the Executive Committee on the request of ten members. No business shall be transacted at a special meeting except that specified in the call.

5. The necessary expenses of the meetings shall be paid from the treasury of the Society.

ARTICLE II.—SECTIONS.

1. For the transaction of scientific business there shall be three Sections, viz.:

Section One. Including the Practice of Medicine, Medical Specialties and Materia Medica and Therapeutics.

Section Two. Including Surgery, Surgical Specialties and Obstetrics.

Section Three. Including Etiology, Hygiene, State Medicine and Medical Jurisprudence.

2. An address not to exceed thirty minutes in length, pertaining in character to the subject-matter of each Section, shall be delivered in the general sessions, when so ordered by the Society.

3. Those to give the addresses may be chosen as the officers of the Society are chosen, or otherwise, as the Society may direct.

4. It shall be the duty of the Chairman and Secretary of each Section to provide suitable papers and discussions for their Section, subject to instructions of the Society and the Executive Committee, and to conduct the proceedings of the Section when in session.

5. The Sections shall meet in rotation or separately at the same hour, as may be determined by the Executive Committee.

Article III.—Committee on Nominations.

1. At each annual meeting a Committee on Nomination shall be organized and shall consist of a representative of each local Society having one or more members in attendance and registered. Such representative may be chosen by the local Society previous to the meeting or by a majority of its members in attendance. Those so chosen and the local Society they represent shall be announced on the morning of the second day as the Nominating Committee, and shall assemble and organize at the hour of 12 o'clock; provided, that representatives of other local societies coming later, so chosen and announced, may be added to the Committee at any time.

2. The duties of the Committee shall be to nominate candidates for all the offices and standing committees, except as otherwise provided, and to recommend a place for the next meeting when it is not to be held at the Capitol.

3. The Committee may also nominate delegates to other societies, and shall consider and report upon any other matters that may be referred to it by the Society.

Article IV.—Papers.

1. It shall be the duty of every member desiring to present a paper to the Society to communicate with the officers of the appropriate Section and forward the title of the same at least one month before the annual meeting.

2. No paper or address shall be received by the Society that has already been published, or read in another Society.

3. No paper or address shall be printed in the transactions unless it shall have been read in full or in abstract before the Society and referred by the Society to the Committee on Publication.

4. Members may have copies of their papers or addresses published in medical journals, provided credit is given the Illinois State Medical Society, and the original shall have been placed in the hands of the Committee on Publication.

5. Papers announced in the printed program shall have precedence over all others.

6. No paper shall exceed twenty minutes in length.

Article V.—Miscellaneous.

1. Reputable practitioners of medicine who may be in attendance at any annual meeting may be extended the courtesies of the Society for that meeting, with the privilege of participating in the scientific proceedings when recommended in writing by two members and having received a majority vote. They shall be known as *Invited Guests.*

2. In discussions, each speaker shall be limited to ten minutes, and no one shall speak twice on the same subject without permission of the Society.

3. Every member, before addressing the Society, may be required to give his name and address, which shall be announced by the chair.

4. For the transaction of business other than scientific, a quorum shall consist of twenty members.

5. Every member shall be registered before participating in any part of the meeting.

6. Applying for membership and paying dues shall be held equivalent, in the obligation of members, to a formal subscription to the Constitution and By-Laws.

7. In discussions, a motion for the previous question must be supported by five members.

8. On all questions of order not provided for by these regulations, Cushing's Manual shall be the guide.

9. These By-Laws may be suspended or changed at any annual meeting by a three-fourths vote of the members present.

UNIVERSITY OF ILLINOIS-URBANA
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